

DRAFT

GUIDE TO OSCAL- BASED FEDRAMP SYSTEM SECURITY PLANS

Version 2

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FedRAMP

DOCUMENT REVISION HISTORY

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11/27/2019	Initial Publication	1.0	FedRAMP PMO
1/24/2020	Adjusted citations to use OSCAL-provided "doc-id" instead of FedRAMP extension "ref-id"	1.1	FedRAMP PMO
7/1/2020	Aligned with OSCAL MR3 syntax. Aligned with new FedRAMP OSCAL Guides. Eliminated most required identifiers in favor of conformity tags.	2.0	FedRAMP PMO

How to Contact Us

For questions about FedRAMP, or for technical questions about this document including how to use it, contact info@FedRAMP.gov.

For more information about FedRAMP, see <https://FedRAMP.gov>.

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I. OVERVIEW

I.1. Who Should Use This Document?

This document is intended for technical staff and tool developers implementing solutions for importing, exporting, and manipulating OSCAL-based FedRAMP System Security Plan (SSP) content.

It provides guidance and examples intended to guide an organization in the production and use of OSCAL-based FedRAMP-compliant SSP files. Our goal is to enable your organization to develop tools that will seamlessly ensure these standards are met so your security practitioners can focus on SSP content and accuracy rather than formatting and presentation.

I.2. Related Documents

This document does not stand alone. It provides information specific to developing tools to create and manage OSCAL-based, FedRAMP-compliant System Security Plans.

Refer to the *Guide to OSCAL-based FedRAMP Content* for foundational information and core concepts.

The [Guide to OSCAL-based FedRAMP Content](#), contains foundational information and core concepts, which apply to all OSCAL-based FedRAMP guides. This document contains several references to that content guide.

I.3. Basic Terminology

XML and JSON use different terminology. Instead of repeatedly clarifying format-specific terminology, this document uses the following format-agnostic terminology through the document.

TERM	XML EQUIVALENT	JSON EQUIVALENT
Field	A single element or node that can hold a value or an attribute	A single object that can hold a value or property
Flag	Attribute	Property
Assembly	A collection of elements or nodes. Typically, a parent node with one or more child nodes.	A collection of objects. Typically, a parent object with one or more child objects.

These terms are used by National Institute of Standards and Technology (NIST) in the creation of OSCAL syntax.

Throughout this document, the following words are used to differentiate between requirements, recommendations, and options.

TERM	MEANING
must	Indicates a required action.
should	Indicates a recommended action, but not necessarily required.
may	Indicates an optional action.

2. FEDRAMP EXTENSIONS, CONFORMITY TAGS, DEFINED IDENTIFIERS, AND ACCEPTED VALUES

NIST designed the core OSCAL syntax to model cybersecurity information that is common to most organization and compliance frameworks; however, NIST also recognized the need to provide flexibility or organizations with unique information needs.

Instead of trying to provide a language that meets each organization's unique needs, NIST provided designed OSCAL with the ability to be extended.

As a result, FedRAMP-compliant OSCAL files are a combination of the core OSCAL syntax and extensions defined by FedRAMP. The [Guide to OSCAL-based FedRAMP Content](#) describes the concepts behind FedRAMP extensions, conformity tags, defined identifiers, and accepted values. The extensions related to the SAP are cited in this document in context of their use.

A summary of the FedRAMP extensions, conformity tags, defined identifiers, and accepted values appears in the FedRAMP OSCAL Registry.

FedRAMP extensions, conformity tags, defined identifiers, and accepted values are cited in relevant portions of this document and summarized in the [FedRAMP OSCAL Registry](#).

These concepts are described in the Guide to OSCAL-based FedRAMP Content.

3. WORKING WITH OSCAL FILES

This section provides a summary of several important concepts and details that apply to OSCAL-based FedRAMP SAP files.

The [*Guide to OSCAL-based FedRAMP Content*](#) provides important concepts necessary for working with any OSCAL-based FedRAMP file. Familiarization with those concepts is important to understanding this guide.

3.1. XML and JSON Formats

The examples provided here are in XML; however, FedRAMP accepts XML or JSON formatted OSCAL-based SAP files. NIST offers a utility that provides lossless conversion of OSCAL-compliant files between XML and JSON in either direction.

You may submit your SAP to FedRAMP using either format. If necessary, FedRAMP tools will convert the files for processing.

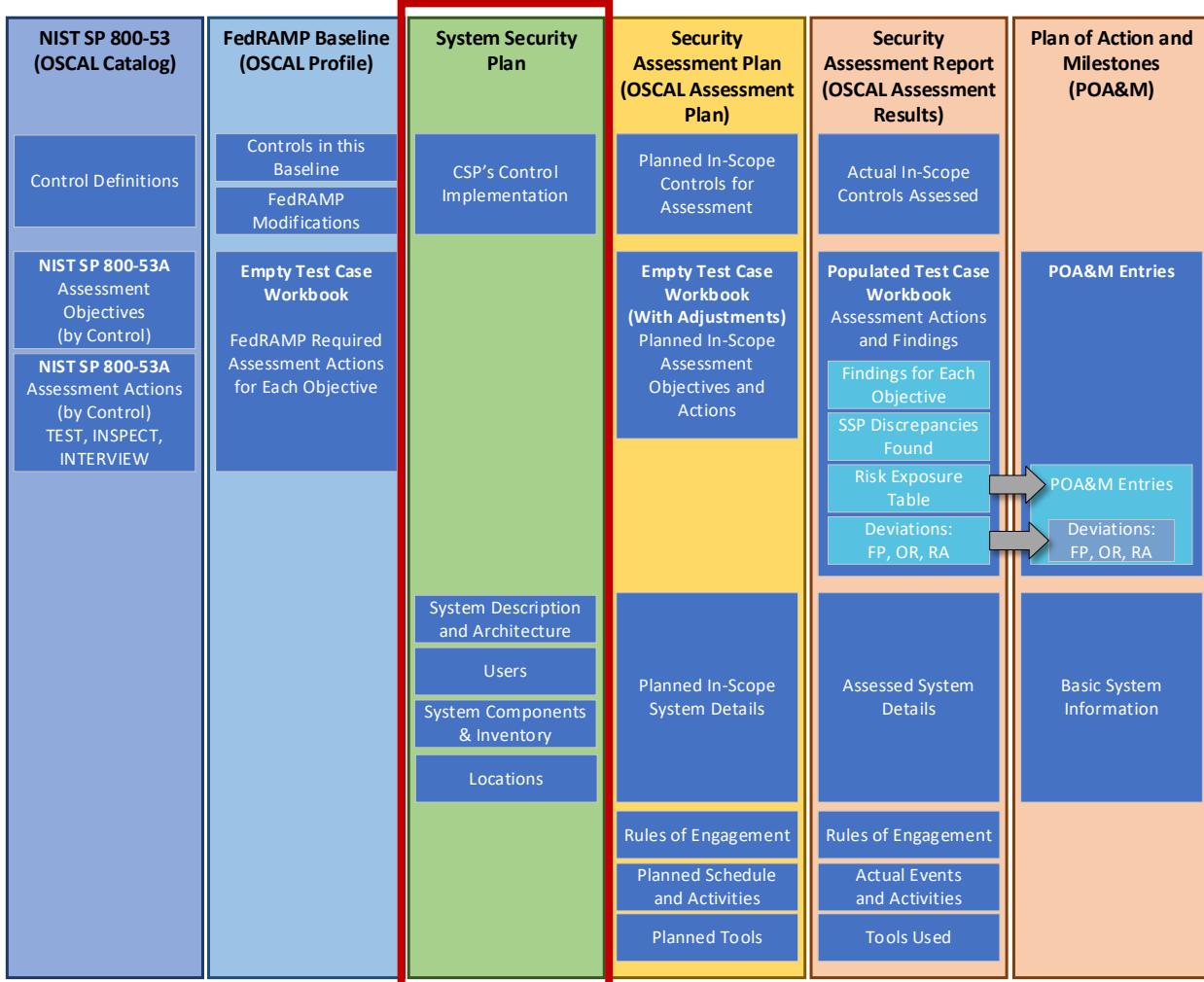
3.2. SSP File Concepts

Unlike the traditional MS Word-based SSP, SAP, and SAR, the OSCAL-based versions of these files are designed to make information available through linkages, rather than duplicating information. In OSCAL, these linkages are established through `import` commands.



Each OSCAL file imports information from the one before it

For example, the NIST control definitions and FedRAMP baseline content that normally appears in Chapter 13 of the SSP are defined in the FedRAMP profile and simply referenced by the SSP.



Baseline Information is referenced instead of duplicated.

For this reason, an OSCAL-based SSP points to the appropriate OSCAL-based FedRAMP baseline as determined by the system's FIPS-199 impact level. Instead of duplicating control details, the OSCAL-

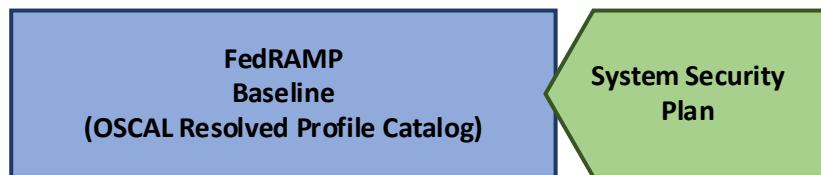
based SSP simply points to the baseline content for information such as control definition statements, FedRAMP-added guidance, parameters, and FedRAMP-required parameter constraints.

3.2.1. Resolved Profile Catalogs

The resolved profile catalog for each FedRAMP baseline is a pre-processing the profile and catalog to produce the resulting data. This reduces overhead for tools by eliminating the need to open and follow references from the profile to the catalog. It also includes only the catalog information relevant to the baseline, reducing the overhead of opening a larger catalog.

Where available, tool developers have the option of following the links from the profile to the catalog as described above, or using the resolved profile catalog.

Developers should be aware that at this time catalogs and profiles remain relatively static. As OSCAL gains wider adoption, there is a risk that profiles and catalogs will become more dynamic, and a resolved profile catalog becomes more likely to be out of date. Early adopters may wish to start with the resolved profile catalog now, and plan to add functionality later for the separate profile and catalog handling later in their product roadmap.



The Resolved Profile Catalog for each FedRAMP Baseline reduces tool processing

For more information about resolved profile catalogs, see the [Guide to OSCAL-based FedRAMP Content Appendix C, Profile Resolution](#).

3.3. OSCAL-based FedRAMP SSP Template

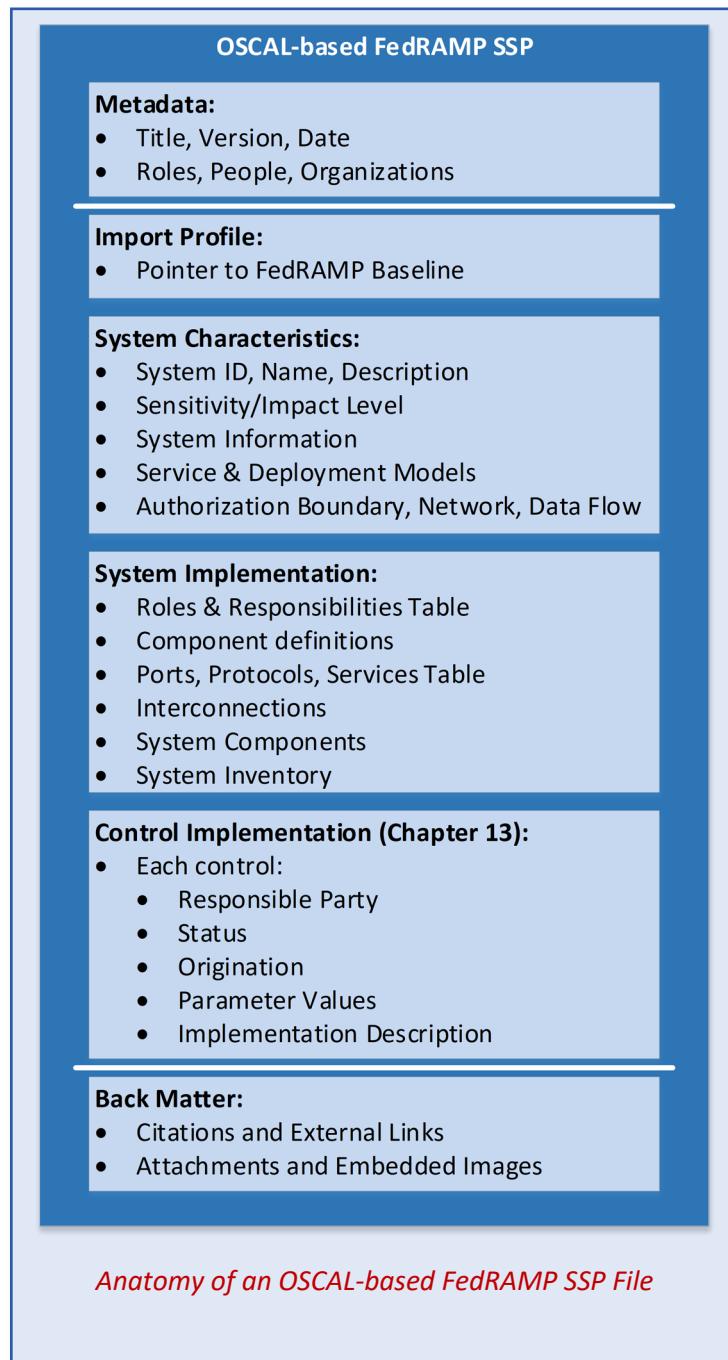
FedRAMP offers an OSCAL-based SSP shell file in both XML and JSON formats. This shell contains many of the FedRAMP required standards to help get you started. This document is intended to work in concert with that shell file. The OSCAL-based FedRAMP SSP Template is available in XML and JSON formats here:

- OSCAL-based FedRAMP SSP Template (JSON Format):
<https://github.com/GSA/fedramp-automation/raw/master/templates/FedRAMP-SSP-OSCAL-Template.json>
- OSCAL-based FedRAMP SSP Template (XML Format):
<https://github.com/GSA/fedramp-automation/raw/master/templates/FedRAMP-SSP-OSCAL-Template.xml>

3.4. OSCAL's Minimum File Requirements

Every OSCAL-based FedRAMP SSP file must have a minimum set of required fields/assemblies, and must follow the OSCAL SSP core syntax found here:

<https://pages.nist.gov/OSCAL/documentation/schema/implementation-layer/ssp>



The SSP-specific assemblies are as follows:

- **Import Profile:** Identifies the OSCAL-based FedRAMP Baseline for the system.
- **System Characteristics:** Represents attributes of the system, such as its name, description, models, and information processed.
- **System Implementation:** Represents relevant information about the system's deployment, including user roles, interconnections, services, and system inventory.
- **Control Implementation:** Describes how each control in the baseline is implemented within the system. This is equivalent to chapter 13 in the MS Word-based SSP Template.

3.5. Importing the FedRAMP Baseline

OSCAL is designed for traceability. Because of this, the system security plan is designed to be linked to the FedRAMP baseline. Rather than duplicating content from the baseline, the SSP is intended to reference the baseline content itself.

Use the `import-profile` field to specify an existing OSCAL-based SSP. The href flag may include any valid uniform resource identifier (URI), including a relative path, absolute path, or URI fragment.

SAP Import Representation
<pre><import-profile href="#[uuid-value]" /></pre> <p>- OR -</p> <pre><import-profile href="#[uuid-value]" /></pre>
XPath Queries
<p>(SSP) URI to Baseline:</p> <pre>/*/import-profile/@href</pre>

If the value is a URI fragment, such as `#96445439-6ce1-4e22-beae-aa72cf173d0`, the value to the right of the hashtag (#) is the UUID value of a resource in the SSP file's back-matter. Refer to the [Guide to OSCAL-based FedRAMP Content](#), Section 2.6, *Citations, Attachments and Embedded Content in OSCAL Files*, for guidance on handling.

SAP Back Matter Representation
<pre><back-matter> <resource id="96445439-6ce1-4e22-beae-aa72cf173d0"> <title>FedRAMP Moderate Baseline</title> <prop name="type" ns="https://fedramp.gov/ns/oscal">baseline</prop> <!-- Specify the XML or JSON file location. Only one required. --> <rlink media-type="application/xml" href=".//CSP_System_SSP.xml" /> <rlink media-type="application/json" href=".//CSP_System_SSP.json" /> </resource> </back-matter></pre>

XPath Queries
<p>(SSP) Referenced OSCAL-based FedRAMP Baseline</p> <p>XML:</p> <pre>/*/back-matter/resource[@uuid='96445439-6ce1-4e22-beae-aa72cf173d0'] /rlink[@media-type='application/xml']/@href</pre> <p>OR JSON:</p> <pre>/*/back-matter/resource[@uuid='96445439-6ce1-4e22-beae-aa72cf173d0'] /rlink[@media-type='application/json']/@href</pre>

4. SSP TEMPLATE TO OSCAL MAPPING

For SSP-specific content, each page of the SSP is represented in this section, along with OSCAL code snippets for representing the information in OSCAL syntax. There is also XPath syntax for querying the code in an OSCAL-based FedRAMP SSP represented in XML format.

Content that is common across OSCAL file types is described in the [Guide to OSCAL-based FedRAMP Content](#). This includes the following:

TOPIC	LOCATION
Title Page	Guide to OSCAL-based FedRAMP Content , Section 4.1
Prepared By/For	Guide to OSCAL-based FedRAMP Content , Section 4.2 - 4.4
Record of Template Changes	Not Applicable. Instead follow Guide to OSCAL-based FedRAMP Content , Section 2.3.2, OSCAL Syntax Version
Revision History	Guide to OSCAL-based FedRAMP Content , Section 4.5
How to Contact Us	Guide to OSCAL-based FedRAMP Content , Section 4.6
Document Approvers	Guide to OSCAL-based FedRAMP Content , Section 4.7
Acronyms and Glossary	Guide to OSCAL-based FedRAMP Content , Section 4.8
Laws, Regulations, Standards and Guidance	Guide to OSCAL-based FedRAMP Content , Section 4.9
Attachments and Citations	Guide to OSCAL-based FedRAMP Content , Section 4.10

It is not necessary to represent the following sections of the SAP template in OSCAL; however, tools should present users with this content where it is appropriate:

- Any blue-text instructions found in the SSP template, where the instructions are related to the content itself.
- Table of Contents
- Introductory and instructive content in sections 1 through 12, such as references to the NIST SP 800-60 Guide to Mapping Types, and the definitions from FIPS Pub 199.
- The control origination definitions in Section 13 (Table 13-2); however, please note hybrid and shared are represented in OSCAL by specifying more than one control origination.

The OSCAL syntax in this guide may be used to represent the High, Moderate, and Low FedRAMP SSP Templates. Simply ensure the correct FedRAMP baseline is referenced using the `import-profile` statement.

The following pages are intended to be printed landscape on tabloid (11" x 17") paper.

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE

CSP Name | Information System Name

Version #., Date

I. INFORMATION SYSTEM NAME/TITLE

This System Security Plan provides an overview of the security requirements for the Information System Name (Enter Information System Abbreviation) and describes the controls in place or planned for implementation to provide a level of security appropriate for the information to be transmitted, processed or stored by the system. Information security is vital to our critical infrastructure and its effective performance and protection is a key component of our national security program. Proper management of information technology systems is essential to ensure the confidentiality, integrity and availability of the data transmitted, processed or stored by the Enter Information System Abbreviation information system.

The security safeguards implemented for the Enter Information System Abbreviation system meet the policy and control requirements set forth in this System Security Plan. All systems are subject to monitoring consistent with applicable laws, regulations, agency policies, procedures and practices.

Table I-1. Information System Name and Title

Unique Identifier	Information System Name	Information System Abbreviation
<Enter FedRAMP Application Number>	Information System Name	Enter Information System Abbreviation

FedRAMP 01000110010001010100010001010010010000010100110101010000010011110101

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4.1. Information System Name, Title, and FedRAMP Identifier

The FedRAMP-assigned application number is the unique ID for a FedRAMP system. OSCAL supports several system identifiers, which may be assigned by different organizations.

For this reason, OSCAL requires the `identifier-type` flag be present and have a value that uniquely identifies the issuing organization. FedRAMP requires its value to be "<http://fedramp.gov>" for all FedRAMP-issued application numbers.

Representation

```
<system-characteristics>
  <system-id identifier-type="http://fedramp.gov">F0000000</system-id>
  <system-name>System's Full Name</system-name>
  <system-name-short>System's Short Name or Acronym</system-name-short>
  <!-- description -->
</system-characteristics>
```

NIST-Defined Identifier

Required Identifier Type:

- `identifier-type="http://fedramp.gov"`

XPath Queries

FedRAMP System Identifier:
`/*/system-characteristics/system-id[@identifier-type="https://fedramp.gov"]`

Information System Name:
`/*/system-characteristics/system-name`

Information System Abbreviation:
`/*/system-characteristics/system-name-short`

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE

CSP Name | Information System Name

Version #., Date

2. INFORMATION SYSTEM CATEGORIZATION

The overall information system sensitivity categorization is recorded in Table 2-1. Security Categorization that follows. Directions for attaching the FIPS 199 document may be found in the following section: **Attachment 10. FIPS 199.**

Table 2-1. Security Categorization

System Sensitivity Level:	Choose level.
---------------------------	---------------

FedRAMP 01000110010001010100010001010010010000010100110101010000010011110101
Controlled Unclassified Information

4.2. Information System Categorization and FedRAMP Baselines

Table 2-1 and Table 2-4 Representation

```
<system-characteristics>
  <!-- description -->
  <prop name="authorization-type" ns="https://fedramp.gov/ns/oscal">fedramp-
agency</prop>
  <!-- annotation, link, date-authorized -->
  <security-sensitivity-level>moderate</security-sensitivity-level>
  <!-- system-information -->
</system-characteristics>
```

FedRAMP Extensions & Accepted Values

```
prop (ns="https://fedramp.gov/ns/oscal"):
  • name="authorization-type"
    o Valid: fedramp-jab, fedramp-agency,
      fedramp-li-saas
```

OSCAL Accepted Values

Valid values for security-sensitivity-level:

- low
- moderate
- high

XPath Queries

System Sensitivity Level:
`/*/system-characteristics/security-sensitivity-level`

URL to OSCAL-based FedRAMP Baseline File:
`/*/import-profile/@href`

FedRAMP Authorization Type:
`/*/system-characteristics/prop[@name="authorization-
type"][@ns="https://fedramp.gov/ns/oscal"]`

NOTES:

- The identified System Sensitivity Level governs which FedRAMP baseline applies. See Appendix A for more information about importing the appropriate FedRAMP baseline.

4.3. Information Types

Table 2-2 and Table 15-9 Representation

```

<system-information>
  <!-- security-sensitivity-level -->
  <information-type name="Information Type Name" id="info-01">
    <information-type-id system="https://doi.org/10.6028/NIST.SP.800-60v2r1">
      C.2.4.1</information-type-id>

    <confidentiality-impact>
      <base>fips-199-moderate</base>
      <selected>fips-199-moderate</selected>
      <adjustment-justification><p>Description</p></adjustment-justification>
    </confidence-impact>
    <integrity-impact>
      <base>fips-199-moderate</base>
      <selected>fips-199-moderate</selected>
      <adjustment-justification><p>Description</p></adjustment-justification>
    </integrity-impact>
    <availability-impact>
      <base>fips-199-moderate</base>
      <selected>fips-199-moderate</selected>
      <adjustment-justification><p>Description</p></adjustment-justification>
    </availability-impact>
  </information-type>
  <!-- repeat the information-type assembly for each information type -->
  <!-- security-impact-levels -->
</system-information>

```

NOTES:

- Table 2-2 is a subset of Table 15-9. The above OSCAL representation satisfies both.
- For each impact type, if the selected field does not match the base field, the adjustment-justification field is required.

The adjustment-justification fields are *Markup multiline*, which enables the text to be formatted. This requires special handling. See [Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL](#), or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

FedRAMP Accepted Values
FedRAMP only accepts NIST SP 800-60 IDs. The system flag of the information-type-id field must be:

- <https://doi.org/10.6028/NIST.SP.800-60v2r1>

OSCAL Accepted Values
Valid impact (base/selected) values:

- fips-199-low
- fips-199-moderate
- fips-199-high

Table 2-2. Sensitivity Categorization of Information Types

Information Type (Use only information types from NIST SP 800-60, Volumes I and II as amended)	NIST 800-60 identifier for Associated Information Type	Confidentiality	Integrity	Availability
System Development	C.3.5.1	Low	Moderate	Low

Information Type (Use only information types from NIST SP 800-60, Volumes I and II as amended)	NIST 800-60 identifier for Associated Information Type	Confidentiality	Integrity	Availability
<Enter Information Type>	<Enter NIST Identifier>	Choose level.	Choose level.	Choose level.
<Enter Information Type>	<Enter NIST Identifier>	Choose level.	Choose level.	Choose level.
<Enter Information Type>	<Enter NIST Identifier>	Choose level.	Choose level.	Choose level.

Table 2-2 is a sub-set of Table 15-9 as follows:

Table Column	Table 2-2	Table 15-9	XPath Queries
Information Type	Yes	Yes	//system-characteristics/system-information/information-type[1]/@name
NIST 800-60 Identifier	Yes	Yes	//system-characteristics/system-information/information-type[1]/information-type-id [@system="https://doi.org/10.6028/NIST.SP.800-60v2r1"]
NIST Recommended Confidentiality Impact Level	No	Yes	//system-characteristics/system-information/information-type[1]/confidence-impact/base
NIST Recommended Integrity Impact Level	No	Yes	//system-characteristics/system-information/information-type[1]/integrity-impact/base
NIST Recommended Availability Impact Level	No	Yes	//system-characteristics/system-information/information-type[1]/availability-impact/base
CSP Selected Confidentiality Impact Level	Yes	Yes	//system-characteristics/system-information/information-type[1]/confidence-impact/selected
CSP Selected Integrity Impact Level	Yes	Yes	//system-characteristics/system-information/information-type[1]/integrity-impact/selected
CSP Selected Availability Impact Level	Yes	Yes	//system-characteristics/system-information/information-type[1]/availability-impact/selected
Impact Adjustment Justification	No	Yes	//system-characteristics/system-information/information-type[1]/confidence-impact/adjustment-justification //system-characteristics/system-information/information-type[1]/integrity-impact/adjustment-justification //system-characteristics/system-information/information-type[1]/availability-impact/adjustment-justification

In each XPath query in the table above, replace the "[1]" with "[2]", "[3]", as needed, up to the number of information-type fields that exist in the file.

Use the following XPath statement to count the number of information-type fields: `count(//system-characteristics/system-information/information-type)`

The FedRAMP SSP Template has only one place to provide the justification of changing any of the three recommended NIST 800-60 levels. OSCAL ties this justification to its individual type (confidence, availability, or integrity). If recreating Table 15-9 from OSCAL data, display all three justifications in this single field, and label each.

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE

CSP Name | Information System Name Version #., Date

2.2. Security Objectives Categorization (FIPS 199)

Based on the information provided in Table 2-2. Sensitivity Categorization of Information Types, for the Enter Information System Abbreviation, default to the high-water mark for the Information Types as identified in Table 2-3. Security Impact Level below.

Table 2-3. Security Impact Level

Security Objective	Low, Moderate or High
Confidentiality	Choose level.
Integrity	Choose level.
Availability	Choose level.

Through review and analysis, it has been determined that the baseline security categorization for the Enter Information System Abbreviation system is listed in the Table 2-4. Baseline Security Configuration that follows.

Table 2-4. Baseline Security Configuration

Enter Information System Abbreviation Security Categorization	Choose level
---	--------------

Using this categorization, in conjunction with the risk assessment and any unique security requirements, we have established the security controls for this system, as detailed in this SSP.

FedRAMP 010001100100010101000100010100100100000101000110101010000010011110101 | 8

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4.4. Security Objectives Categorization (FIPS 199)

Representation

```
<system-characteristics>
  <!-- cut -->
  <security-sensitivity-level>moderate</security-sensitivity-level>
  <!-- system-information -->
```

NIST Accepted Values
Valid security sensitivity values:

- low
- moderate
- high

```
<security-impact-level>
  <security-objective-confidentiality>fips-199-moderate
  </security-objective-confidentiality>

  <security-objective-integrity>fips-199-moderate</security-objective-integrity>
  <security-objective-availability>fips-199-moderate

  </security-objective-availability>
</security-impact-level>
<!-- status -->
</system-characteristics>
```

NIST Accepted Values
Valid security objective values:

- fips-199-low
- fips-199-moderate
- fips-199-high

XPath Queries

System Sensitivity Level:
 `/*/system-characteristics/security-sensitivity-level`

Security Objective: Confidentiality:
 `/*/system-characteristics/security-impact-level/security-objective-confidentiality`

Security Objective: Integrity:
 `/*/system-characteristics/security-impact-level/security-objective-integrity`

Security Objective: Availability:
 `/*/system-characteristics/security-impact-level/security-objective-availability`

NOTES:

- The `security-sensitivity-level` field in the OSCAL file satisfies both Table 2-1 and 2-4.

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE

CSP Name | Information System Name

Version #., Date

2.3. Digital Identity Determination

The digital identity information may be found in Attachment 3, Digital Identity Worksheet.

Note: NIST SP 800-63-3, Digital Identity Guidelines, does not recognize the four Levels of Assurance model previously used by federal agencies and described in OMB M-04-04, instead requiring agencies to individually select levels corresponding to each function being performed.

The digital identity level is Choose an item.

4.5. Digital Identity Determination

The digital identity level identified in Section 2.3 is the same as the level in Attachment 3. Both are identified with the same single piece of information, which is a `prop` field with the name "security-eauth-level".

This is a FedRAMP extension, thus requires the `ns` flag set to "fedramp".

Currently, FedRAMP prescribes an overall eAuth level, and does not require individual IAL, AAL, and FAL designations. The overall eAuth level is all that is required; however, the FedRAMP extensions include separate prop statements for each of these three levels to allow for possible future use.

Representation

<system-characteristics>

```
<prop name="security-eauth-level" class="security-eauth"
      ns="https://fedramp.gov/ns/oscal">2</prop>

<!-- Attachment 3, Digital Identity Worksheet -->
<prop name="identity-assurance-level">2</prop>
<prop name="authenticator-assurance-level">2</prop>
<prop name="federation-assurance-level">2</prop>
</system-characteristics>
```

FedRAMP Extensions

prop:

- name="security-eauth-level"
ns="https://fedramp.gov/ns/oscal"

NIST Accepted Values

Valid eAuth values:

- 1 for low
- 2 for moderate
- 3 for high

XPath Queries

Digital Identity Level:

```
/*system-characteristics/prop[@name="security-eauth-level"]
[@ns='https://fedramp.gov/ns/oscal']
```

Identity Assurance Level:

```
/*system-characteristics/prop[@name="identity-assurance-level"]
```

Authenticator Assurance Level:

```
/*system-characteristics/prop[@name="authenticator-assurance-level"]
```

Federation Assurance Level:

```
/*system-characteristics/prop[@name="federation-assurance-level"]
```

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE

CSP Name | Information System Name

Version #., Date

3. INFORMATION SYSTEM OWNER

The following individual is identified as the system owner or functional proponent/advocate for this system.

Table 3-1. Information System Owner

Information System Owner Information	
Name	<Enter Name>
Title	<Enter Title>
Company / Organization	<Enter Company/Organization>
Address	<Enter Address, City, State and Zip>
Phone Number	<555-555-5555>
Email Address	<Enter email address>

NOTES ON ADDRESSES

Preferred Approach: When multiple parties share the same address, such as multiple staff members at a company HQ, define the location once as a location assembly, then use the location-uuid field within each party assembly to identify the location of that individual or team.

Alternate Approach: If the address is unique to this individual, it may be included in the party assembly itself.

Hybrid Approach: It is possible to include both a location-uuid and an address assembly within a party assembly. This may be used where multiple staff are in the same building, yet have different office numbers or mail stops. Use the location-uuid to identify the shared building, and only include a single addr-line field within the party's address assembly.

A tool developer may elect to always create a location assembly, even when only used once; however, tools must recognize and handle all of the above approaches above when processing OSCAL files.

4.6. Information System Owner

A role with an id value of "system-owner" is required. Use the responsible-party assembly to associate this role with the party assembly containing the System Owner's information.

Representation

```

<metadata>
  <!-- cut -->
  <role id="system-owner"><!-- cut --></role>
  <location uuid="uuid-of-hq-location">
    <title>CSP HQ</title>
    <address type="work">
      <addr-line>1234 Some Street</addr-line>
      <city>Haven</city>
      <state>ME</state>
      <postal-code>00000</postal-code>
    </address>
  </location>
  <party uuid="uuid-of-csp" type="organization">
    <party-name>Cloud Service Provider (CSP) Name</party-name>
  </party>
  <party uuid="uuid-of-person-1" type="person">
    <party-name>[SAMPLE] Person Name 1</party-name>
    <prop name="title" ns="https://fedramp.gov/ns/oscal">Individual's Title</prop>
    <address>
      <addr-line>Mailstop A-1</addr-line>
    </address>
    <email>name@org.domain</email>
    <phone>202-000-0000</phone>
    <member-of-organization>uuid-of-csp</member-of-organization>
    <location-uuid>uuid-of-hq-location</location-uuid>
  </party>
  <responsible-party role-id="system-owner">
    <party-uuid>uuid-of-person-1</party-uuid>
  </responsible-party>
</metadata>

```

NIST-Defined Identifier

Required role ID:

- system-owner

XPath Queries

System Owner's Name:

```
/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="system-owner"]/
  party-uuid]]/party-name
```

NOTE: Replace "party-name" with "email" or "phone" above as needed.

System Owner's Address:

```
/*/metadata/location[@uuid=/*/metadata/party[@uuid=[/*/metadata/responsible-party
  [@role-id="system-owner"]]/party-uuid]]/location-uuid]/address/addr-line
```

NOTE: Replace "addr-line" with "city", "state", or "postal-code" above as needed.

System Owner's Title:

```
/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="system-owner"]/
  party-uuid]]/prop[@name='title'][@ns='https://fedramp.gov/ns/oscal']
```

Company/Organization:

```
/*/metadata/party[@uuid=/*/metadata/party[@uuid=[/*/metadata/responsible-party
  [@role-id="system-owner"]]/party-uuid]]/member-of-organization]/party-name
```

NOTE:

- If no country is provided, FedRAMP tools will assume a US address.

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE

CSP Name | Information System Name

Version #., Date

4. AUTHORIZING OFFICIALS

Instruction: The Authorizing Official is determined by the authorization.

JAB P-ATO: FedRAMP, JAB, as comprised of member representation of the Government Executive (GSA), Department of Defense (DoD) and Agency Authority to Operate (ATO): Agency Authorizing Official

Delete this and all other instructions from your final version.

The Authorizing Official (AO) or Designated Approving Authority (DAA) for this information system is the *Insert AO information as instructed above.*

FedRAMP JAB P-ATO Authorization Representation

```
<metadata>
  <!-- cut -->
  <role id="authorizing-official">
    <title>Authorizing Official</title>
    <desc>The government executive(s) who authorize this system.</desc>
  </role>
  <!-- cut -->
  <party uuid="uid-of-fedramp-jab">
    <org>
      <org-name>FedRAMP: Joint Authorization Board</org-name>
      <short-name>FedRAMP JAB</short-name>
    </org>
  </party>
  <!-- cut -->
  <responsible-party role-id="authorizing-official">
    <party-uuid>uid-of-fedramp-jab</party-uuid>
  </responsible-party>
</metadata>
<!-- import -->
<system-characteristics>
  <!-- description -->
  <prop name="authorization-type"
        ns="https://fedramp.gov/ns/oscal">fedramp-jab</prop>
  <!-- annotation -->
</system-characteristics>
```

JAB XPath Queries

Authorizing Official's Name:
`/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="authorizing-official"]]/party-uuid]]/party-name`

Controlled Unclassified Information

4.7. Authorizing Officials

A role with an id value of "authorizing-official" is required. Use the responsible-party assembly to associate this role with the party assembly containing the Authorizing Official's information.

FedRAMP Agency Authorization Representation

```
<metadata>
  <role id="authorizing-official">
    <title>Authorizing Official</title>
    <desc>The government executive(s) who authorize this system.</desc>
  </role>
  <party uuid="uid-of-agency" type="organization">
    <party-name>Agency Name</party-name>
  </party>
  <party uuid="uid-of-person-6" type="person">
    <party-name>[SAMPLE] Person Name 6</party-name>
    <prop name="title" ns="https://fedramp.gov/ns/oscal">Individual's Title</prop>
    <email>name@org.domain</email>
    <phone>202-000-0000</phone>
    <member-of-organization>uid-of-agency</member-of-organization>
  </party>
  <responsible-party role-id="authorizing-official">
    <party-uuid>uid-of-person-6</party-uuid>
  </responsible-party>
</metadata>
<!-- import -->
<system-characteristics>
  <!-- description -->
  <prop name="authorization-type"
        ns="https://fedramp.gov/ns/oscal">fedramp-agency</prop>
  <!-- annotation -->
</system-characteristics>
```

Authorization Type XPath Query

FedRAMP Authorization Type:
`/*/system-characteristics/prop[@name="authorization-type"][@ns="https://fedramp.gov/ns/oscal"]`

FedRAMP Agency and LI-SaaS XPath Queries

Authorizing Official's Name:
`/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="authorizing-official"]]/party-uuid]]/party-name`

NOTE: Replace "party-name" with "email" or "phone" above as needed.

Authorizing Official's Title:
`/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="authorizing-official"]]/party-uuid]]/prop[@name='title'][@ns='https://fedramp.gov/ns/oscal']`

Authorizing Official's Agency:
`/*/metadata/party[@uuid=[/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="authorizing-official"]]/party-uuid]]/member-of-organization]/party-name`

NOTE:

- If the authorization-type field is "fedramp-jab", the responsible-party/party-uuid field must be the uuid value for the FedRAMP JAB.

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE																																							
CSP Name Information System Name	Version #., Date																																						
5. OTHER DESIGNATED CONTACTS																																							
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Controlled Unclassified Information

4.8. Other Designated Contacts: Information System Management

A role with an id value of "system-poc-management" is required. Use the responsible-party assembly to associate this role with the party assembly containing the Information System Manager's information.

Table 5-1 Representation

```

<metadata>
  <!-- cut -->
  <role id="system-poc-management"><!-- cut --></role>
  <location uuid="uuid-of-hq-location">
    <title>CSP HQ</title>
    <address type="work">
      <addr-line>1234 Some Street</addr-line>
      <city>Haven</city>
      <state>ME</state>
      <postal-code>00000</postal-code>
    </address>
  </location>
  <party uuid="uuid-of-csp" type="organization">
    <party-name>Cloud Service Provider (CSP) Name</party-name>
  </party>
  <party uuid="uuid-of-person-5" type="person">
    <party-name>[SAMPLE] Person Name 5</party-name>
    <prop name="title" ns="https://fedramp.gov/ns/oscal">Individual's Title</prop>
    <email>name@org.domain</email>
    <phone>202-000-0000</phone>
    <member-of-organization>uuid-of-csp</member-of-organization>
    <location-uuid>uuid-of-hq-location</location-uuid>
  </party>
  <responsible-party role-id="system-poc-management">
    <party-uuid>uuid-of-person-5</party-uuid>
  </responsible-party>
</metadata>

```

NIST Defined Identifiers

Required Role ID's:

- system-poc-management

FedRAMP Extension

Person's Title:

- prop name="title" ns="https://fedramp.gov/ns/oscal"

XPath Queries

Information System Management POC Name:

```
/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="system-poc-management"] / party-uuid]]/party-name
```

NOTE: Replace "party-name" with "email" or "phone" above as needed.

Information System Management POC's Address:

```
/*/metadata/location[@uuid=/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="system-poc-management"] / party-uuid]]/location-uuid]/address/addr-line
```

NOTE: Replace "addr-line" with "city", "state", or "postal-code" above as needed.

Information System Management POC's Title:

```
/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="system-poc-management"] / party-uuid]]/prop[@name='title'][@ns='https://fedramp.gov/ns/oscal']
```

Company/Organization:

```
/*/metadata/party[@uuid=[/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="system-poc-management"] / party-uuid]]/member-of-organization]/party-name]
```

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE																																			
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4.9. Other Designated Contacts: Information System Technical

Role assemblies with id values of "system-poc-technical" and "system-poc-other" are required. Use responsible-party assemblies to associate these roles with the party assemblies containing the system points of contact.

Table 5-2 Representation

```

<metadata>
  <!-- cut -->
  <role id="system-poc-technical"><!-- cut --></role>
  <role id="system-poc-other"><!-- cut --></role>
  <location uuid="uuid-of-hq-location">
    <title>CSP HQ</title>
    <address type="work">
      <addr-line>1234 Some Street</addr-line>
      <city>Haven</city>
      <state>ME</state>
      <postal-code>00000</postal-code>
    </address>
  </location>
  <party uuid="uuid-of-csp" type="organization">
    <party-name>Cloud Service Provider (CSP) Name</party-name>
  </party>
  <party uuid="uuid-of-person-7" type="person">
    <party-name>[SAMPLE] Person Name 7</party-name>
    <prop name="title" ns="https://fedramp.gov/ns/oscal">Individual's Title</prop>
    <email>name@org.domain</email>
    <phone>202-000-0000</phone>
    <member-of-organization>uuid-of-csp</member-of-organization>
    <location-uuid>uuid-of-hq-location</location-uuid>
  </party>
  <!-- repeat party assembly for each person -->
  <responsible-party role-id="system-poc-technical">
    <party-uuid>uuid-of-person-7</party-uuid>
  </responsible-party>
  <responsible-party role-id="system-poc-other">
    <party-uuid>uuid-of-person-8</party-uuid>
    <party-uuid>uuid-of-person-9</party-uuid>
  </responsible-party>
</metadata>

```

NIST Defined Identifiers

Required Role ID's:

- system-poc-technical
- system-poc-other

FedRAMP Extension

Person's Title:

- prop name="title" ns="https://fedramp.gov/ns/oscal"

XPath Queries

Information System Technical POC Name:

```
/*/metadata/party[@uid=[/*/metadata/responsible-party[@role-id="system-poc-technical"]]/party-uuid]]/party-name
```

NOTE: Replace "party-name" with "email" or "phone" above as needed.

Information System Technical POC's Address:

```
/*/metadata/location[@uid=/*/metadata/party[@uid=[/*/metadata/responsible-party[@role-id="system-poc-technical"]]/party-uuid]]/location-uuid]/address/addr-line
```

NOTE: Replace "addr-line" with "city", "state", or "postal-code" above as needed.

Information System Technical POC's Title:

```
/*/metadata/party[@uid=[/*/metadata/responsible-party[@role-id="system-poc-technical"]]/party-uuid]]/prop[@name='title'][@ns='https://fedramp.gov/ns/oscal']
```

Company/Organization:

```
/*/metadata/party[@uid=/*/metadata/party[@uid=[/*/metadata/responsible-party[@role-id="system-poc-technical"]]/party-uuid]]/member-of-organization]/party-name
```

4.10. Assignment of Security Responsibility: ISSO

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE

CSP Name | Information System Name

Version #., Date

6. ASSIGNMENT OF SECURITY RESPONSIBILITY

The Information System Security Officers (ISSO), or their equivalent, identified below, have been appointed in writing and are deemed to have significant cyber and operational role responsibilities.

Table 6-1. CSP Name Internal ISSO (or Equivalent) Point of Contact

CSP Name Internal ISSO (or Equivalent) Point of Contact	
Name	<Enter Name>
Title	<Enter Title>
Company / Organization	<Enter Company/Organization>
Address	<Enter Address, City, State and Zip>
Phone Number	<555-555-5555>
Email Address	<Enter email address>

Table 6-2. AO Point of Contact

AO Point of Contact	
Name	<Enter Name>
Title	<Enter Title>
Organization	<Enter Company/Organization>
Address	<Enter Address, City, State and Zip>
Phone Number	<555-555-5555>
Email Address	<Enter email address>

FedRAMP Extension

Person's Title:

- prop name="title"
ns="https://fedramp.gov/ns/oscal"

Table 6-1 Representation

```

<metadata>
  <!-- cut -->
  <role id="information-system-security-officer"><!-- cut --></role>
    <title>System Information System Security Officer (or Equivalent)</title>
    <desc>The individual responsible for the security posture of the system.</desc>
  </role>
  <location uuid="uuid-of-hq-location">
    <title>CSP HQ</title>
    <address type="work">
      <addr-line>1234 Some Street</addr-line>
      <city>Haven</city>
      <state>ME</state>
      <postal-code>00000</postal-code>
    </address>
  </location>
  <party uuid="uuid-of-csp" type="organization">
    <party-name>Cloud Service Provider (CSP) Name</party-name>
  </party>
  <party uuid="uuid-of-person-10" type="person">
    <party-name>[SAMPLE] Person Name 10</party-name>
    <prop name="title" ns="https://fedramp.gov/ns/oscal">Individual's Title</prop>
    <email>name@org.domain</email>
    <phone>202-000-0000</phone>
    <member-of-organization>uuid-of-csp</member-of-organization>
    <location-uuid>uuid-of-hq-location</location-uuid>
  </party>
  <!-- repeat party assembly for each person -->
  <responsible-party role-id="system-poc-technical">
    <party-uuid>uuid-of-person-7</party-uuid>
  </responsible-party>
</metadata>

```

NIST Defined Identifiers

Required Role ID's:

- information-system-security-officer

XPath Queries

ISSO POC Name:
`/*/metadata/party[@uid=[/*/metadata/responsible-party[@role-id="information-system-security-officer"]]/party-uid]]/party-name`

NOTE: Replace "party-name" with "email" or "phone" above as needed.

ISSO POC's Address:
`/*/metadata/location[@uid=[/*/metadata/party[@uid=[/*/metadata/responsible-party[@role-id="information-system-security-officer"]]/party-uid]]/location-uid]/address/addr-line`

NOTE: Replace "addr-line" with "city", "state", or "postal-code" above as needed.

ISSO POC's Title:
`/*/metadata/party[@uid=[/*/metadata/responsible-party[@role-id="information-system-security-officer"]]/party-uid]]/prop[@name='title'][@ns='https://fedramp.gov/ns/oscal']`

Company/Organization:
`/*/metadata/party[@uid=[/*/metadata/party[@uid=[/*/metadata/responsible-party[@role-id="information-system-security-officer"]]/party-uid]]/member-of-organization]/party-name`

4.11. Assignment of Security Responsibility: AO POC

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE

CSP Name | Information System Name

Version #., Date

6. ASSIGNMENT OF SECURITY RESPONSIBILITY

The Information System Security Officers (ISSO), or their equivalent, identified below, have been appointed in writing and are deemed to have significant cyber and operational role responsibilities.

Table 6-1. CSP Name Internal ISSO (or Equivalent) Point of Contact

CSP Name Internal ISSO (or Equivalent) Point of Contact	
Name	<Enter Name>
Title	<Enter Title>
Company / Organization	<Enter Company/Organization>
Address	<Enter Address, City, State and Zip>
Phone Number	<555-555-5555>
Email Address	<Enter email address>

Table 6-2. AO Point of Contact

AO Point of Contact	
Name	<Enter Name>
Title	<Enter Title>
Organization	<Enter Company/Organization>
Address	<Enter Address, City, State and Zip>
Phone Number	<555-555-5555>
Email Address	<Enter email address>

Table 6-2 Representation

```

<metadata>
  <!-- cut -->
  <role id="authorizing-official-poc">
    <title>Authorizing Official's Point of Contact</title>
    <desc>The individual representing the authorizing official.</desc>
  </role>
  <location uuid="uuid-of-agency-office">
    <title>Agency Office</title>
    <address type="work">
      <addr-line>1234 Some Street</addr-line>
      <city>Washington</city>
      <state>DC</state>
      <postal-code>00000</postal-code>
    </address>
  </location>
  <party uuid="uuid-of-agency" type="organization">
    <party-name>Full Agency Name Here</party-name>
    <short-name>FANH</short-name>
  </party>
  <party uuid="uuid-of-person-11" type="person">
    <party-name>[SAMPLE] Person Name 11</party-name>
    <prop name="title" ns="https://fedramp.gov/ns/oscal">Individual's Title</prop>
    <email>name@org.domain</email>
    <phone>202-000-0000</phone>
    <member-of-organization>uuid-of-agency</member-of-organization>
    <location-uuid>uuid-of-agency-office</location-uuid>
  </party>
  <!-- repeat party assembly for each person -->
  <responsible-party role-id="authorizing-official-poc">
    <party-uuid>uuid-of-person-11</party-uuid>
  </responsible-party>
</metadata>

```

NIST-Defined Identifier

Required Role ID:

- authorizing-official-poc

FedRAMP Extension

Person's Title:

- prop name="title" ns="https://fedramp.gov/ns/oscal"

XPath Queries

AO POC Name:

```
/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="authorizing-official-poc"]/
party-uuid]]/party-name
```

NOTE: Replace "party-name" with "email" or "phone" above as needed.

AO POC's Address:

```
/*/metadata/location[@uuid=[/*/metadata/party[@uuid=[/*/metadata/responsible-party [@role-
id="authorizing-official-poc"]]/party-uuid]]/location-uuid]/address/addr-line
```

NOTE: Replace "addr-line" with "city", "state", or "postal-code" above as needed.

AO POC's Title:

```
/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="authorizing-official-poc"]/
party-uuid]]/prop[@name='title'][@ns='https://fedramp.gov/ns/oscal']
```

Company/Organization:

```
/*/metadata/party[@uuid=[/*/metadata/party[@uuid=[/*/metadata/responsible-
party[@role-id="authorizing-official-poc"]]/party-uuid]]/member-of-
organization]/party-name
```

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7. INFORMATION SYSTEM OPERATIONAL STATUS

The system is currently in the life-cycle phase shown in Table 7-1. System Status that follows. (Only operational systems can be granted an ATO).

Table 7-1. System Status

System Status		
<input type="checkbox"/>	Operational	The system is operating and in production.
<input type="checkbox"/>	Under Development	The system is being designed, developed, or implemented
<input type="checkbox"/>	Major Modification	The system is undergoing a major change, development, or transition.
<input type="checkbox"/>	Other	Explain: Click here to enter text.

Instruction: Select as many status indicators as apply. If more than one status is selected, list which components of the system are covered under each status indicator.

Delete this and all other instructions from your final version of this document.

The `remarks` field is *Markup multiline*, which enables the text to be formatted. This requires special handling. See *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

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4.12. Information System Operational Status

Representation

```
<system-characteristics>
  <!-- cut -->

  <!-- security-impact-level -->
  <status state="operational">
    <remarks>
      <p>Remarks are optional if status/state is "operational".</p>
      <p>Remarks are required otherwise.</p>
    </remarks>
  </status>
  <!-- leveraged-authorization -->

  <!-- cut -->
</system-characteristics>
```

NIST Accepted Values

Valid state values:

- `operational`
- `under-development`
- `under-major-modification`
- `disposition`
- `other`

XPath Queries

System's Operational Status:
`/*/system-characteristics/status/@state`

The number of paragraphs in the Operational Status Remarks:
`count(/*/system-characteristics/status/remarks/p[1])`

Remarks on System's Operational Status:
`/*/system-characteristics/status/remarks`

NOTE:

- If the status is "other", the `remarks` field is required. Otherwise it is optional.
- While `under-development`, and `disposition` are valid OSCAL values, systems with either of these operational status values are not eligible for a FedRAMP Authorization.

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8.1. Cloud Service Models

Information systems, particularly those based on cloud architecture models, are made up of different service layers. Below are some questions that help the system owner determine if their system is a cloud followed by specific questions to help the system owner determine the type of cloud.

Question (Yes/No)	Conclusion
Does the system use virtual machines?	A no response means that system is most likely not a cloud.
Does the system have the ability to expand its capacity to meet customer demand?	A no response means that the system is most likely not a cloud.
Does the system allow the consumer to build anything other than servers?	A no response means that the system is an IaaS. A yes response means that the system is either a PaaS or a SaaS.
Does the system offer the ability to create databases?	A yes response means that the system is a PaaS.
Does the system offer various developer toolkits and APIs?	A yes response means that the system is a PaaS.
Does the system offer only applications that are available by obtaining a login?	A yes response means that system is a SaaS. A no response means that the system is either a PaaS or an IaaS.

The layers of the Enter Information System Abbreviation defined in this SSP are indicated in Table 8-1. Service Layers Represented in this SSP that follows.

Instruction: Check all layers that apply.

Delete this and all other instructions from your final version of this document.

Table 8-1. Service Layers Represented in this SSP

Service Provider Architecture Layers		
<input type="checkbox"/>	Software as a Service (SaaS)	Major Application
<input type="checkbox"/>	Platform as a Service (PaaS)	Major Application
<input type="checkbox"/>	Infrastructure as a Service (IaaS)	General Support System
<input type="checkbox"/>	Other	Explain: Click here to enter text.

Note: Refer to NIST SP 800-145 for information on cloud computing architecture models.

The `remarks` field is *Markup multiline*, which enables the text to be formatted. This requires special handling. See *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

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4.13. Cloud Service Models

Representation

```
<system-characteristics>
  <!-- cut -->

  <!-- prop -->
  <annotation name="cloud-service-model" value="saas">
    <remarks>
      <p>Remarks are required if service model is "other". Optional otherwise.</p>
    </remarks>
  </annotation>
  <!-- link or date authorized -->

  <!-- cut -->
</system-characteristics>
```

NIST Accepted Values
Valid Service Model values:

- saas
- paas
- iaas
- other

XPath Queries

```
Service Model:
/*/system-characteristics/annotation[@name="cloud-service-model"]/@value

Remarks on System's Service Model:
/*/system-characteristics/annotation[@name="cloud-service-model"]//remarks
```

NOTE:

- If the service model is "other", the `remarks` field is required. Otherwise it is optional.

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8.2. Cloud Deployment Models

Information systems are made up of different deployment models. The deployment models of the Enter Information System Abbreviation that are defined in this SSP and are not leveraged by any other FedRAMP Authorizations, are indicated in Table 8-2. Cloud Deployment Model Represented in this SSP that follows.

Instruction: Check deployment model that applies.

Delete this and all other instructions from your final version of this document.

Table 8-2. Cloud Deployment Model Represented in this SSP

Service Provider Cloud Deployment Model		
<input type="checkbox"/>	Public	Cloud services and infrastructure supporting multiple organizations and agency clients
<input type="checkbox"/>	Private	Cloud services and infrastructure dedicated to a specific organization/agency and no other clients
<input type="checkbox"/>	Government Only Community	Cloud services and infrastructure shared by several organizations/agencies with same policy and compliance considerations
<input type="checkbox"/>	Hybrid	Explain: (e.g., cloud services and infrastructure that provides private cloud for secured applications and data where required and public cloud for other applications and data) Click here to enter text.

The `remarks` field is *Markup multiline*, which enables the text to be formatted. This requires special handling. See *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

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4.14. Cloud Deployment Models

Representation

```
<system-characteristics>
  <!-- cut -->

  <!-- prop -->
  <annotation name="cloud-deployment-model" value="public">
    <remarks>
      <p>Remarks are required if deployment model is "hybrid". Optional otherwise.</p>
    </remarks>
  </annotation>
  <!-- link or date authorized -->
```



```
<!-- cut -->
</system-characteristics>
```

XPath Queries

Deployment Model:
`/*/system-characteristics/annotation[@name="cloud-deployment-model"]/@value`

Remarks on System's Deployment Model:
`/*/system-characteristics/annotation[@name="cloud-deployment-model"]/remarks`

NIST Accepted Values
 Valid Service Model values:

- public-cloud
- private-cloud
- community-cloud
- government-only-cloud
- hybrid-cloud
- other

NOTE:

- If the deployment model is "hybrid", the remarks field is required. Otherwise it is optional.

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8.3. Leveraged Authorizations

Instruction: The FedRAMP program qualifies different service layers for Authorizations. One or multiple service layers can be qualified in one System Security Plan. If a lower level layer has been granted an Authorization and another higher level layer represented by this SSP plans to leverage a lower layer's Authorization, this System Security Plan must clearly state that intention. If an information system does not leverage any pre-existing Authorizations, write "None" in the first column of the table that follows. Add as many rows as necessary in the table that follows.

Delete this and all other instructions from your final version of this document.

The Enter Information System Abbreviation Choose an item leverages a pre-existing FedRAMP Authorization. FedRAMP Authorizations leveraged by this Enter Information System Abbreviation are listed in Table 8-3. Leveraged Authorizations that follows.

Table 8-3. Leveraged Authorizations

Leveraged Information System Name	Leveraged Service Provider Owner	Date Granted
<Enter Leveraged information system name1>	<Enter service provider owner1>	<Date>
<Enter Leveraged information system name2>	<Enter service provider owner2>	<Date>
<Enter Leveraged information system name3>	<Enter service provider owner3>	<Date>

The remarks field is *Markup multiline*, which enables the text to be formatted. This requires special handling. See *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

At the time of writing, the NIST OSCAL syntax validation tools require the leveraged-authorization @name attribute, and limits the value to NCName type, which is unintentionally limiting. This section will be updated when the issue is closed by NIST as tracked [HERE](#).

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4.15. Leveraged Authorizations

***** - Section requires rework pending final decisions from NIST.

Representation

```

<metadata>
  <!-- role -->
  <party id="eip">
    <org>
      <org-name>Example IaaS Provider</org-name>
      <short-name>E.I.P.</short-name>
      <remarks>
        <p>Underlying service provider. Leveraged Authorization.</p>
      </remarks>
    </org>
  </party>
  <!-- responsible-party -->
</metadata>
<!-- cut -->
<system-characteristics>
  <!-- status -->
  <leveraged-authorization id="lva-1" name="NCName">
    <annotation name="system-name" id="leveraged-01-name"
      ns="https://fedramp.gov/ns/oscal" value="MegaIaaS">
      <remarks><p>Remarks about this system</p></remarks>
    </annotation>
    <party-id>eip</party-id>
    <date-authorized>2018-11-27</date-authorized>
    <remarks><p>Overall notes about the inheritance of controls from this
system</p></remarks>
  </leveraged-authorization>
  <!-- Repeat leveraged-authorization assembly for each leveraged authorization -->
  <!-- authorization-boundary -->
</system-characteristics>

```

FedRAMP Extension

annotation

- (ns="https://fedramp.gov/ns/oscal"):
 - name="system-name"

XPath Queries

Leveraged Authorization System Name:
`/*/system-characteristics/leveraged-authorization[1]/annotation[@name="system-name"] [@ns="https://fedramp.gov/ns/oscal"]/@value`

Leveraged Authorization Remarks:
`/*/system-characteristics/leveraged-authorization[1]/annotation[@name="system-name"] [@ns="https://fedramp.gov/ns/oscal"]/remarks`

Leveraged Service Provider Owner:
`/*/metadata/party[@id=/*/system-characteristics/leveraged-authorization[1]/party-id]/org/org-name`

Date Granted:
`/*/system-characteristics/leveraged-authorization[1]/date-authorized`

Replace "[1]" with "[2]", "[3]", etc.

NOTE:

- The id for leveraged-authorization is required by FedRAMP, even though it is optional in the OSCAL syntax. The id will be used by each control that inherits from this system.
- If more than one leveraged authorization exists for the system, repeat the entire assembly for each leveraged authorization. Currently this is not typical and should be discussed in advance with the FedRAMP PMO.

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9.1. System Function or Purpose

Instruction: In the space that follows, describe the purpose and functions of this system.

Delete this and all other instructions from your final version of this document.

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4.16. System Function or Purpose

Representation

```
<system-characteristics>
  <!-- system-name, system-name-short -->
  <description>
    <p>Describe the purpose and functions of this system here.</p>
  </description>
  <!-- prop, annotation, link, date-authorized -->
</system-characteristics>
```

XPath Query

System Function or Purpose: First paragraph in description
`/*/system-characteristics/description`

The `description` field is *Markup multiline*, which enables the text to be formatted. This requires special handling. See *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

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9.2. Information System Components and Boundaries

Instruction: In the space that follows, provide an explicit definition of the system's Authorization Boundary. Provide a diagram that portrays this Authorization Boundary and all its connections and components, including the means for monitoring and controlling communications at the external boundary and at key internal boundaries within the system. Address all components and managed interfaces of the information system authorized for operation (e.g., routers, firewalls).

The diagram must include a predominant border drawn around all system components and services included in the authorization boundary. The diagram must be easy to read and understand.

Formal names of components as they are known at the service provider organization in functional specifications, configuration guides, other documents and live configurations shall be named on the diagram and described. Components identified in the Boundary diagram should be consistent with the Network diagram and the inventory(ies). Provide a key to symbols used. Ensure consistency between the boundary and network diagrams and respective descriptions (Section 9.4) and the appropriate Security Controls [AC-20, CA-3(1)].

Additional FedRAMP Requirements and Guidance:

Guidance: See the FedRAMP Documents page under Key Cloud Service Provider (CSP) Documents> FedRAMP Authorization Boundary Guidance <https://www.fedramp.gov/documents/>

Delete this and all other instructions from your final version of this document.

A detailed and explicit definition of the system authorization boundary diagram is represented in Figure 9-1. Authorization Boundary Diagram below.

In OSCAL, the link field's href flag may be any URI that points to the actual diagram image file; however, FedRAMP requires the authorization boundary, network, and data flow diagrams to be embedded or attached via back-matter\resource assemblies. This means the href flag should always be a URI fragment (#diagram-id). FedRAMP tools must recognize the fragment, and locate the appropriate resource using the diagram ID. /*/back-matter/resource[@id='diagram-id'])

The description fields are *Markup multiline* and the caption field is *Markup-line*. These enable the text to be formatted, which requires special handling. See *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

FedRAMP has not yet established image format standards for the authorization boundary, network, and dataflow diagrams. Please use a format that will render natively in most modern browsers, and ensure the image quality is high enough to read all text when zoomed in.

4.17. Authorization Boundary Diagram

The OSCAL approach to this type of diagram is to treat the image data as either a linked or base64-encoded resource in the back-matter section of the OSCAL file, then use a reference to the diagram within the body of the OSCAL file.

Representation

```
<system-characteristics>
  <!-- leveraged-authorization -->
  <authorization-boundary>
    <description>
      <p>A holistic, top-level explanation of the FedRAMP authorization boundary.</p>
    </description>
    <diagram uuid="uuid-value">
      <description><p>A diagram-specific explanation.</p></description>
      <link href="#uuid-of-boundary-diagram-1" rel="diagram" />
      <caption>Authorization Boundary Diagram</caption>
    </diagram>
    <!-- repeat diagram assembly for each additional boundary diagram -->
  </authorization-boundary>
  <!-- network-architecture -->
</system-characteristics>

<!-- cut -->

<back-matter>
  <resource uuid="uuid-of-boundary-diagram-1">
    <desc>The primary authorization boundary diag</desc>
    <base64>00000000</base64>
  </resource>
</back-matter>
```

FedRAMP-Defined Identifiers

Diagram ID:

- sys-boundary-**1**

Resource ID:

- diag-boundary-**1**

Replace **1** with a number (2, 3, etc.) as needed.
There should always be a -1 in the SSP.

XPath Queries

Overall Description:

```
/*/system-characteristics/authorization-boundary/description
```

Count the Number of Diagrams (There should be at least 1):

```
count(/*/system-characteristics/authorization-boundary/diagram)
```

Link to First Diagram:

```
/*/system-characteristics/authorization-boundary/diagram[1]/link/@href
```

Replace "[1]" with "[2]", "[3]", etc.

If the diagram link points to a resource within the OSCAL file:

```
/*/back-matter/resource[@uuid="uuid-of-boundary-diagram"]/base64
```

OR:

```
/*/back-matter/resource[@uuid="uuid-of-boundary-diagram-1"]/rlink/@href
```

Diagram-specific Description:

```
/*/system-characteristics/authorization-boundary/diagram[1]/description
```

NOTE:

- While resources may generally be linked or embedded, FedRAMP prefers the authorization boundary diagram to be embedded (base64).

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9.3. Types of Users

All personnel have their status categorized with a sensitivity level in accordance with PS-2. Personnel (employees or contractors) of service providers are considered Internal Users. All other users are considered External Users. User privileges (authorization permission after authentication takes place) are described in Table 9-1. Personnel Roles and Privileges that follows.

NIST Accepted Values

annotation:

- name="type"
 - **Valid:** internal, external, general-public
- name="privilege-type"
 - **Valid:** privileged, non-privileged, no-logical-access

Table 9-1. Personnel Roles and Privileges

Role	Internal or External	Privileged (P), Non-Privileged (NP), or No Logical Access (NLA)	Sensitivity Level	Authorized Privileges	Functions Performed
UNIX System Administrator	Internal	P	Moderate	Full administrative access (root)	Add/remove users and hardware, install and configure software, OS updates, patches and hotfixes, perform backups
Client Administrator	External	NP	N/A	Portal administration	Add/remote client users. Create, modify and delete client applications
Program Director	Internal	NLA	Limited	N/A	Reviews, approves and enforces policy
	Choose an item.	Choose an item.	Choose an item.		
	Choose an item.	Choose an item.	Choose an item.		
	Choose an item.	Choose an item.	Choose an item.		
	Choose an item.	Choose an item.	Choose an item.		

There are currently <number> internal personnel and <number> external personnel. Within one year, it is anticipated that there will be <number> internal personnel and <number> external personnel.

See Next Page

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4.18. Personnel Roles and Privileges

Representation

```

<metadata>
  <role id="admin-unix">
    <title>Unix Administrator</title>
    <desc>This is a sample role.</desc>
  </role>
</metadata>
<!-- import -->
<!-- system characteristics -->
<system-implementation>
  <!-- prop -->
  <user uuid="uuid-value">
    <title>Unix System Administrator</title>
    <prop name="sensitivity" ns="https://fedramp.gov/ns/oscal">limited</prop>
    <annotation name="type" value="external" />
    <annotation name="privilege-level" value="no-logical-access" />
    <role-id>admin-unix</role-id>
    <authorized-privilege name="Full administrative access (root)">
      <function-performed>Add/remove users and hardware</function-performed>
      <function-performed>install and configure software</function-performed>
      <function-performed>OS updates, patches and hotfixes</function-performed>
      <function-performed>perform backups</function-performed>
    </authorized-privilege>
    <!-- for each user repeat authorized-privilege assembly for each privilege -->
  </user>
  <!-- repeat user assembly for each row in Table 9-1 -->
</system-implementation >
```

FedRAMP Extension & Accepted Values

- ```
prop (ns="https://fedramp.gov/ns/oscal"):
```
- name="sensitivity-level"
    - **Valid:** high-risk, severe, moderate, limited, not-applicable

### XPath Queries

Number of entries in the role table:  
`count(/system-implementation/user)`

Role:  
`/*/system-implementation/user[1]/title`

Internal or External:  
`/*/system-implementation/user[1]/annotation[@name="type"]/@value`

Privileged, Non-Privileged, or No Logical Access:  
`/*/system-implementation/user[1]/annotation[@name="privilege-level"]/@value`

Sensitivity Level:  
`/*/system-implementation/user[1]/prop[@name="sensitivity"][@ns="https://fedramp.gov/ns/oscal"]`

Authorized Privileges:  
`/*/system-implementation/user[1]/authorized-privilege/@name[1]`

Functions Performed:  
`/*/system-implementation/user[1]/authorized-privilege[1]/function-performed[1]`

`count(/system-implementation/user[1]/authorized-privilege[1]/function-performed)`

Replace "[1]" with "[2]", "[3]", etc.

### NOTE:

- FedRAMP prefers the `authorized-privilege` field be repeated within a user assembly if there is more than one, but will accept all `authorized-privileges` in one field during the early stages of OSCAL adoption.
- FedRAMP prefers separate `function-performed` fields for each function performed but will accept all functions in one field during the early stages of OSCAL adoption.

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### 9.3. Types of Users

All personnel have their status categorized with a sensitivity level in accordance with PS-2. Personnel (employees or contractors) of service providers are considered Internal Users. All other users are considered External Users. User privileges (authorization permission after authentication takes place) are described in Table 9-1. Personnel Roles and Privileges that follows.

*Instruction: For an External User, write "Not Applicable" in the Sensitivity Level Column. This table must include all roles including systems administrators and database administrators as a role types. (Also include web server administrators, network administrators and firewall administrators if these individuals have the ability to configure a device or host that could impact the CSP service offering.)*

*This table must also include whether these roles are fulfilled by foreign nationals or systems outside the United States.*

*Delete this and all other instructions from your final version of this document.*

*Table 9-1. Personnel Roles and Privileges*

| Role                      | Internal or External | Privileged (P), Non-Privileged (NP), or No Logical Access (NLA) | Sensitivity Level | Authorized Privileges             | Functions Performed                                                                                              |
|---------------------------|----------------------|-----------------------------------------------------------------|-------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------|
| UNIX System Administrator | Internal             | P<br><b>See Previous Page</b>                                   | Moderate          | Full administrative access (root) | Add/remove users and hardware, install and configure software, OS updates, patches and hotfixes, perform backups |
| Client Administrator      | External             | NP                                                              | N/A               | Portal administration             | Add/remote client users. Create, modify and delete client applications                                           |
| Program Director          | Internal             | NLA                                                             | Limited           | N/A                               | Reviews, approves and enforces policy                                                                            |
|                           | Choose an item.      | Choose an item.                                                 | Choose an item.   |                                   |                                                                                                                  |
|                           | Choose an item.      | Choose an item.                                                 | Choose an item.   |                                   |                                                                                                                  |
|                           | Choose an item.      | Choose an item.                                                 | Choose an item.   |                                   |                                                                                                                  |
|                           | Choose an item.      | Choose an item.                                                 | Choose an item.   |                                   |                                                                                                                  |

There are currently <number> internal personnel and <number> external personnel. Within one year, it is anticipated that there will be <number> internal personnel and <number> external personnel.

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## 4.19. Number of Users

The Core OSCAL syntax does not provide fields for the number of internal and external users. These current and future values are handled as FedRAMP Extensions.

### Representation

```
<system-implementation>
 <prop name="users-internal" ns="https://fedramp.gov/ns/oscal">22</prop>
 <prop name="users-external" ns="https://fedramp.gov/ns/oscal">110</prop>
 <prop name="users-internal-future" ns="https://fedramp.gov/ns/oscal">25</prop>
 <prop name="users-external-future" ns="https://fedramp.gov/ns/oscal">200</prop>
</system-implementation>
```

### FedRAMP Extensions

```
prop(ns="https://fedramp.gov/ns/oscal"):
 • name="users-internal"
 • name="users-external"
 • name="users-internal-future"
 • name="users-external-future"
```

### XPath Queries

Number of current internal users:

```
/*/system-implementation/prop[@name="users-internal"]
[@ns="https://fedramp.gov/ns/oscal"]
```

Number of current external users:

```
/*/system-implementation/prop[@name="users-external"]
[@ns="https://fedramp.gov/ns/oscal"]
```

Number of future internal users (1 year):

```
/*/system-implementation/prop[@name="users-internal-future"]
[@ns="https://fedramp.gov/ns/oscal"]
```

Number of future external users (1 year):

```
/*/system-implementation/prop[@name="users-external-future"]
[@ns="https://fedramp.gov/ns/oscal"]
```

-

**FEDRAMP SYSTEM SECURITY PLAN (SSP) HIGH BASELINE TEMPLATE**

CSP Name | Information System Name Version # Date

## II. SYSTEM INTERCONNECTIONS

**Instruction:** List all interconnected systems. Provide the IP address and interface identifier (eth0, eth1, eth2) for the CSP system that provides the connection. Name the external organization and the IP address of the external system. Provide a point of contact and phone number for the external organization. For Connection Security, indicate how the connection is being secured. For Data Direction, indicate which direction the packets are flowing. For Information Being Transmitted, describe what type of data is being transmitted. If a dedicated telecom line is used, indicate the circuit number. Add additional rows as needed. This table must be consistent with Table 13-3 CA-3 Authorized Connections.

**Additional FedRAMP Requirements and Guidance:**

**Guidance:** See the FedRAMP Documents page under Key Cloud Service Provider (CSP) Documents > FedRAMP Authorization Boundary Guidance <https://www.fedramp.gov/documents/>

Delete this and all other instructions from your final version of this document.

Table 11-1 System Interconnections below is consistent with Table 13-3 CA-3 Authorized Connections.

**Table 11-1. System Interconnections**

SP* IP Address and Interface	External Organization Name and IP Address of System	External Point of Contact and Phone Number	Connection Security (IPSec VPN, SSL, Certificates, Secure File Transfer, etc.)**	Data Direction (incoming, outgoing, or both)	Information Being Transmitted	Port or Circuit Numbers
<SP IP Address/Interface>	<External Org/IP>	<External Org POC> <Phone 555-555-5555>	<Enter Connection Security>	Choose an item.	<Information Transmitted>	<Port/Circuit Numbers>
<SP IP Address/Interface>	<External Org/IP>	<External Org POC> <Phone 555-555-5555>	<Enter Connection Security>	Choose an item.	<Information Transmitted>	<Port/Circuit Numbers>
<SP IP Address/Interface>	<External Org/IP>	<External Org POC> <Phone 555-555-5555>	<Enter Connection Security>	Choose an item.	<Information Transmitted>	<Port/Circuit Numbers>
<SP IP Address/Interface>	<External Org/IP>	<External Org POC> <Phone 555-555-5555>	<Enter Connection Security>	Choose an item.	<Information Transmitted>	<Port/Circuit Numbers>
<SP IP Address/Interface>	<External Org/IP>	<External Org POC> <Phone 555-555-5555>	<Enter Connection Security>	Choose an item.	<Information Transmitted>	<Port/Circuit Numbers>

The remarks fields are *Markup multiline*, which enables the text to be formatted. This requires special handling. See *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

**Table 13-3. CA-3 Authorized Connections**

Authorized Connections Information System Name	Name of Organization CSP Name System Connects To	Role and Name of Person Who Signed Connection Agreement	Name and Date of Interconnection Agreement
<Authorized Connections System Name>	<Name Org CSP System Connects To>	<Role and Name Signed Connection Agreement>	<Name and Date of Interconnection Agreement>
<Authorized Connections System Name>	<Name Org CSP System Connects To>	<Role and Name Signed Connection Agreement>	<Name and Date of Interconnection Agreement>
<Authorized Connections System Name>	<Name Org CSP System Connects To>	<Role and Name Signed Connection Agreement>	<Name and Date of Interconnection Agreement>

Queries are for the ISA's remote POC and AO information. To obtain the ISA's local POC and AO information:

Replace "isa-poc-remote" with "isa-poc-local"  
Replace "[isa-authorizing-official-remote]" with "isa-authorizing-official-local"

## 4.20. System Interconnections and Authorized Connections (Queries)

### XPath Queries

Replace "[1]" with "[2]", "[3]", etc.

(11-1) Service Processor (SP):  
`/*/system-implementation/component[@component-type='interconnection'][1]/prop[@name="service-processor"][@ns="https://fedramp.gov/ns/oscal"]`

(11-1) IP Address and Interface:  
`/*/system-implementation/component[@component-type='interconnection'][1]/prop[@name="ip-address-local"][@ns="https://fedramp.gov/ns/oscal"]`

(11-1) External Organization Name ...:  
`/*/metadata/party[@uid=/*/system-implementation/component[@component-type='interconnection'][1]/responsible-role/party-uuid]/party-name`

AND IP Address of System:  
`/*/system-implementation/component[@component-type='interconnection'][1]/prop[@name="ipv4-address"][@class="remote"][@ns="https://fedramp.gov/ns/oscal"]`

(11-1) External Point of Contact ...:  
`/*/metadata/party[@uid=/*/system-implementation/component[@component-type='interconnection'][1]/responsible-party/party-uuid]/party-name`

AND Phone Number:  
`/*/metadata/party[@id=/*/system-implementation/component[@component-type='interconnection'][1]/responsible-party/party-id]/phone`

(11-1) Connection Security:  
`/*/system-implementation/component[@component-type='interconnection'][1]/annotation[@name="connection-security"][@ns="https://fedramp.gov/ns/oscal"]/@value`

(11-1) Connection Security - Remark (required if "other"):  
`/*/system-implementation/component[@component-type='interconnection'][1]/annotation[@name="connection-security"][@ns="https://fedramp.gov/ns/oscal"]/remarks`

(11-1) Data Direction:  
`/*/system-implementation/component[@component-type='interconnection'][1]/prop[@name="direction"][@ns="https://fedramp.gov/ns/oscal"]`

(11-1) Information Being Transmitted:  
`/*/system-implementation/component[@component-type='interconnection'][1]/prop[@name="information"][@ns="https://fedramp.gov/ns/oscal"]`

(11-1) Port or Circuit Numbers:  
`/*/system-implementation/component[@component-type='interconnection'][1]/prop[@name="port" or @name="circuit"][@ns="https://fedramp.gov/ns/oscal"]`

(13-3) Authorized Connections Information System Name:  
`/*/system-implementation/component[@component-type='interconnection'][1]/title`

(13-3) Name of Organization CSP Name System Connects To [same as (11-1) External Org Name]:  
`/*/metadata/party[@uid=/*/metadata/party[@uid=/*/system-implementation/component[@component-type='interconnection'][1]/responsible-role[@role-id='isa-poc-remote']/party-uuid]/member-of-organization]/party-name`

(13-3) Role of Person Who Signed Connection Agreement (Remote)  
`/*/metadata/party[@uid=/*/system-implementation/component[@component-type='interconnection'][1]/responsible-role[@role-id='isa-authorizing-official-remote']/party-uuid]/prop[@name="title"][@ns="https://fedramp.gov/ns/oscal"]`

(13-3) Name of Person Who Signed Connection Agreement (Remote) [same as (11-1)]  
`/*/metadata/party[@uid=/*/system-implementation/component[@component-type='interconnection'][1]/responsible-role[@role-id='isa-authorizing-official-remote']/party-uuid]/party-name`

(11-1) POC Phone Number:  
`/*/metadata/party[@uid=/*/system-implementation/component[@component-type='interconnection'][1]/responsible-role[@role-id='isa-poc-remote']/party-uuid]/phone`

**FEDRAMP SYSTEM SECURITY PLAN (SSP) \_\_\_\_\_ BASELINE TEMPLATE**

CSP Name | Information System Name Version #., Date

---

## 9.4. Network Architecture

*Instruction: Insert a network architectural diagram in the space that follows. Ensure that the following items are labeled on the diagram: hostnames, Domain Name System (DNS) servers, DHCP servers, authentication and access control servers, directory servers, firewalls, routers, switches, database servers, major applications, storage, Internet connectivity providers, telecom circuit numbers, network interfaces and numbers, VLANs. Major security components should be represented. If necessary, include multiple network diagrams.*

*Delete this and all other instructions from your final version of this document.*

Assessors should be able to easily map hardware, software and network inventories back to this diagram.

The logical network topology is shown in Figure 9-2. Network Diagram mapping the data flow between components.

The following Figure 9-2. Network Diagram(s) provides a visual depiction of the system network components that constitute Enter Information System Abbreviation.



In OSCAL, the `link` field's `href` flag may be any URI that points to the actual diagram image file; however, FedRAMP requires the authorization boundary, network, and data flow diagrams to be embedded or attached via `back-matter\resource` assemblies. This means the `href` flag should always be a URI fragment (#diagram-id). FedRAMP tools must recognize the fragment, and locate the appropriate resource using the diagram ID. (`/*/back-matter/resource[@id='diagram-id']`)

The `description` fields are *Markup multiline* and the `caption` field is *Markup-line*. These enable the text to be formatted, which requires special handling. See *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

FedRAMP has not yet established image format standards for the authorization boundary, network, and dataflow diagrams. Please use a format that will render natively in most modern browsers, and ensure the image quality is high enough to read all text when zoomed in.

## 4.21. Network Architecture Diagram(s)

### Representation

```
<system-characteristics>
 <!-- authorization-boundary -->
 <network-architecture>
 <description>
 <p>A holistic, top-level explanation of the system's network.</p>
 </description>
 <diagram uuid="uuid-value">
 <description><p>A diagram-specific explanation.</p></description>
 <link href="#uuid-of-network-diagram-1" rel="diagram" />
 <caption>Network Diagram</caption>
 </diagram>
 <!-- repeat diagram assembly for each additional network diagram -->
 </network-architecture>
 <!-- data-flow -->
</system-characteristics>

<!-- cut -->

<back-matter>
 <!-- citation -->
 <resource uuid="uuid-of-network-diagram-1">
 <desc>The primary network diagram.</desc>
 <rlink href=".//diagram.jpg" media-type="image/jpeg"/>
 </resource>
</back-matter>
```

### FedRAMP-Defined Identifiers

#### Diagram ID:

- sys-network-**1**

#### Resource ID:

- diag-network-**1**

Replace **1** with a number (2, 3, etc.) as needed. There should always be a -1 in a SSP.

### XPath Queries

**Overall Description:**  
`/*/system-characteristics/network-architecture/description`

**Count the Number of Diagrams (There should be at least 1):**  
`count(/*/system-characteristics/network-architecture/diagram)`

**Link to First Diagram:**

`/*/system-characteristics/network-architecture/diagram[1]/link/@href`

Replace "[1]" with "[2]", "[3]", etc.

**If the diagram link points to a resource within the OSCAL file:**  
`/*/back-matter/resource[@uuid="uuid-of-network-diagram-1"]/base64`

**OR:**

`/*/back-matter/resource[@uuid="uuid-of-network-diagram-1"]/rlink/@href`

**First Diagram Description:**

`/*/system-characteristics/network-architecture/diagram[1]/description`

### NOTE:

- While resources may generally be linked or embedded, FedRAMP prefers the network architecture diagrams to be embedded (base64).

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## 10. SYSTEM ENVIRONMENT AND INVENTORY

Directions for attaching the FedRAMP Inventory Workbook may be found in the following section:  
Attachment 13, FedRAMP Inventory Workbook.

*Instruction: In the space that follows, provide a general description of the technical system environment. Include information about all system environments that are used, e.g., production environment, test environment, staging or QA environments. Include the specific location of the alternate, backup and operational facilities.*

*In your description, also include a reference to Attachment 13, the system's Integrated Inventory Workbook, which should provide a complete listing of the system's components (operating systems/infrastructure, web applications/software, and databases). The Integrated Inventory Workbook should be maintained and updated monthly by the CSP, as part of continuous monitoring efforts. Instructions for completing the Integrated Inventory Workbook are provided within the Integrated Inventory Workbook.*

*Delete this and all other instructions from your final version of this document.*

**FedRAMP-Conformity Tags**

Data Center Location:

- data-center

Primary or Backup Data Center Location:

- primary-data-center
- alternate-data-center

---

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Controlled Unclassified Information

## 4.22. Data Center Locations

### Representation

```
<metadata>
 <!-- role -->
 <location uuid="uuid-of-data-center-location-1">
 <title>Primary Data Center</title>
 <address>
 <addr-line>2222 Main Street</addr-line>
 <city>Anywhere</city>
 <state>--</state>
 <postal-code>00000-0000</postal-code>
 </address>
 <prop name="conformity" ns="https://fedramp.gov/ns/oscal">data-center</prop>
 <prop name="conformity" ns="https://fedramp.gov/ns/oscal">primary-data-center</prop>
 </location>

 <location uuid="uuid-of-data-center-location-2">
 <title>Secondary Data Center</title>
 <address>
 <addr-line>3333 Small Road</addr-line>
 <city>Anywhere</city>
 <state>--</state>
 <postal-code>00000-0000</postal-code>
 </address>
 <prop name="conformity" ns="https://fedramp.gov/ns/oscal">data-center</prop>
 <prop name="conformity" ns="https://fedramp.gov/ns/oscal">alternate-data-center</prop>
 </location>
</metadata>
```

### XPath Queries

```
List of Data Centers:
/*/metadata/location/prop[@name='conformity'] [@ns='https://fedramp.gov/ns/oscal']
[string()='data-center']/../title

Count of Data Centers (integer):
count(/*/metadata/location/prop[@name='conformity'] [@ns='https://fedramp.gov/ns/oscal']
[string()='data-center'])

Street Address of First Data Center:
/*/metadata/location/prop[@name='conformity'] [@ns='https://fedramp.gov/ns/oscal']
[string()='data-center'])[1]/../address/addr-line

Is first data center identified as the primary data center (true/false):
/*/metadata/location/prop[@name='conformity'] [@ns='https://fedramp.gov/ns/oscal']
[string()='data-center'])[1]/../prop[@name='conformity']
[@ns='https://fedramp.gov/ns/oscal']/string()='primary-data-center'
```

### NOTE:

- Replace "[1]" with "[2]", "[3]", etc.
- Replace "addr-line" with "city", "state", or "postal-code" as needed for the remainder of the address.
- Replace "primary-data-center" with "alternate-data-center" to determine if the data center was identified as an alternate or backup data center.

**FEDRAMP SYSTEM SECURITY PLAN (SSP) \_\_\_\_\_ BASELINE TEMPLATE**

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---

### 10.1. Data Flow

*Instruction: In the space that follows, describe the flow of data in and out of system boundaries and insert a data flow diagram. Describe protections implemented at all entry and exit points in the data flow as well as internal controls between customer and project users. Include data flows for privileged and non-privileged authentication/authorization to the system for internal and external users. If necessary, include multiple data flow diagrams.*

*Delete this and all other instructions from your final version of this document.*

The data flow in and out of the system boundaries is represented in Figure 10-1. Data Flow Diagram, below.



**Figure 10-1. Data Flow Diagram**

In OSCAL, the `link` field's `href` flag may be any URI that points to the actual diagram image file; however, FedRAMP requires the authorization boundary, network, and data flow diagrams to be embedded or attached via back-matter\resource assemblies. This means the `href` flag should always be a URI fragment (#diagram-id). FedRAMP tools must recognize the fragment, and locate the appropriate resource using the diagram ID. (`/*/back-matter/resource[@id='diagram-id']`)

The `description` fields are *Markup multiline* and the `caption` field is *Markup-line*. These enable the text to be formatted, which requires special handling. See *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

FedRAMP has not yet established image format standards for the authorization boundary, network, and dataflow diagrams. Please use a format that will render natively in most modern browsers, and ensure the image quality is high enough to read all text when zoomed in.

## 4.23. Data Flow Diagrams

### Representation

```
<system-characteristics>
 <!-- network-architecture -->
 <data-flow>
 <description>
 <p>A holistic, top-level explanation of the system's data flows.</p>
 </description>
 <diagram uuid="uuid-value">
 <description><p>A diagram-specific explanation.</p></description>
 <link href="#uuid-of-dataflow-diagram-1" rel="diagram" />
 <caption>Data Flow Diagram</caption>
 </diagram>
 <!-- repeat diagram assembly for each additional data flow diagram -->
 </data-flow>
 <!-- network-architecture -->
</system-characteristics>

<!-- cut -->

<back-matter>
 <!-- citation -->
 <resource uuid="uuid-of-network-diagram-1">
 <desc>The primary data flow diagram.</desc>
 <base64>0000<!-- base64 cut -->0000</base64>
 </resource>
</back-matter>
```

### FedRAMP-Defined Identifiers

#### Diagram ID:

- sys-dataflow-**1**

#### Resource ID:

- diag-dataflow-**1**

Replace **1** with a number (2, 3, etc.) as needed. There should always be a -1 in a SSP.

### XPath Queries

#### Overall Description:

```
/*/system-characteristics/data-flow/description
```

Count the Number of Diagrams (There should be at least 1):  
`count(/*/system-characteristics/data-flow/diagram)`

#### Link to First Diagram:

```
/*/system-characteristics/data-flow/diagram[1]/link/@href
```

Replace "[1]" with "[2]", "[3]", etc.

If the diagram link points to a resource within the OSCAL file:

```
/*/back-matter/resource[@uuid="uuid-of-dataflow-diagram-1"]/base64
```

OR:

```
/*/back-matter/resource[@uuid="uuid-of-dataflow-diagram-1"]/rlink/@href
```

#### First Diagram Description:

```
/*/system-characteristics/data-flow/diagram[1]/description
```

### NOTE:

- While resources may generally be linked or embedded, FedRAMP prefers the data flow diagrams to be embedded (base64).

## 10.2. Ports, Protocols and Services

The Table 10-1. Ports, Protocols and Services below lists the ports, protocols and services enabled in this information system.

*Instruction: In the column labeled "Used By" please indicate the components of the information system that make use of the ports, protocols and services. In the column labeled "Purpose" indicate the purpose for the service (e.g., system logging, HTTP redirector, load balancing). This table should be consistent with CM-6 and CM-7. You must fill out this table, even if you are leveraging a pre-existing FedRAMP Authorization. Add more rows as needed.*

*Delete this and all other instructions from your final version of this document.*

Table 10-1. Ports, Protocols and Services

Ports (TCP/UDP)*	Protocols	Services	Purpose	Used By
<Enter Port>	<Enter Protocols>	<Enter Services>	<Enter Purpose>	<Enter Used By>
<Enter Port>	<Enter Protocols>	<Enter Services>	<Enter Purpose>	<Enter Used By>
<Enter Port>	<Enter Protocols>	<Enter Services>	<Enter Purpose>	<Enter Used By>
<Enter Port>	<Enter Protocols>	<Enter Services>	<Enter Purpose>	<Enter Used By>
<Enter Port>	<Enter Protocols>	<Enter Services>	<Enter Purpose>	<Enter Used By>
<Enter Port>	<Enter Protocols>	<Enter Services>	<Enter Purpose>	<Enter Used By>

\* Transmission Control Protocol (TCP), User Diagram Protocol (UDP)

### FedRAMP Extensions

```
prop(ns="https://fedramp.gov/ns/oscal"):
 • name="used-by"
```

The **description** fields are *Markup multiline* and the **purpose** field is *Markup-line*. These enable the text to be formatted, which requires special handling. See *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit:

<https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

NIST has consolidated OSCAL syntax and is now handling ports, protocols and services as components. This is a change from the SSP Syntax in Milestone Release 2.

## 4.24. Ports, Protocols and Services

Entries in the ports, protocols, and services table are represented as component assemblies, with the component-type flag set to "service". Use a protocol assembly for each protocol associated with the service. For a single port, set the port-range start flag and end flag to the same value.

### Representation

```
<system-implementation>
 <!-- user -->
 <component uuid="uuid-of-service" component-type="service">
 <title>[SAMPLE] Service Name</title>
 <description><p>Describe the service</p></description>
 <purpose>Describe the purpose the service is needed.</purpose>
 <prop name="used-by" ns="https://fedramp.gov/ns/oscal">What uses this service?</prop>
 <prop name="protocol"></prop>
 <status state="operational" />
 <protocol name="http">
 <port-range start="80" end="80" transport="TCP"/>
 </protocol>
 <protocol name="https">
 <port-range start="443" end="443" transport="TCP"/>
 </protocol>
 </component>
 <!-- Repeat the component assembly for each row in Table 10-1 -->
 <!-- system-inventory -->
</system-implementation>
```

### XPath Queries

```
Number of entries in the Ports, Protocols and Services table:
 count(//*[@system-implementation/component[@component-type='service']])

Number of protocols specified (1st service):
 count(//*[@system-implementation/component[@component-type='service']][1]/protocol)

Number of port ranges specified (1st service, 1st protocol):
 count(//*[@system-implementation/component[@component-type='service']][1]/protocol[1]/port-range)

Ports: Start (1st service, 1st protocol, 1st port range):
 /*/system-implementation/component[@component-type='service'][1]/protocol[1]/port-range[1]/@start

Ports: End (1st service, 1st protocol, 1st port range):
 /*/system-implementation/component[@component-type='service'][1]/protocol[1]/port-range[1]/@end

Ports: Transport (1st service, 1st protocol, 1st port range):
 /*/system-implementation/component[@component-type='service'][1]/protocol[1]/port-range[1]/@transport

Protocol (1st service, 1st protocol):
 /*/system-implementation/component[@component-type='service'][1]/protocol[1]/@name

Service (1st service):
 /*/system-implementation/component[@component-type='service'][1]/title

Purpose (1st service):
 /*/system-implementation/component[@component-type='service'][1]/purpose

Used By (1st service):
 /*/system-implementation/component[@component-type='service'][1]/prop[@name="used-by"]
 [@ns="https://fedramp.gov/ns/oscal"]
```

Replace "[1]" with "[2]", "[3]", etc.

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## II. SYSTEM INTERCONNECTIONS

**FedRAMP Extensions & Accepted Values**

annotation

```
(ns="https://fedramp.gov/ns/oscal"):
 • name="connection-security"
 ○ Valid: ipsec, vpn, ssl, certificate, secure-file-transfer, other
```

Delete this and all other instructions from your final version of this document.

Table 11-1 System Interconnections below is consistent with Table 13-3 CA-3 Authorized Connections.

Table 11-1. System Interconnections

SP* IP Address and Interface	External Organization Name and IP Address of System	External Point of Contact and Phone Number	Connection Security (IPSec VPN, SSL, Certificates, Secure File Transfer, etc.)**	Data Direction (incoming, outgoing, or both)	Information Being Transmitted	Port or Circuit Numbers
<SP IP Address/interface>	<External Org/IP>	<External Org POC> <Phone 555-555-5555>	<Enter Connection Security>	Choose an item.	<Information Transmitted>	<Port/Circuit Numbers>
<SP IP Address/interface>	<External Org/IP>	<External Org POC> <Phone 555-555-5555>	<Enter Connection Security>	Choose an item.	<Information Transmitted>	<Port/Circuit Numbers>
<SP IP Address/interface>	<External Org/IP>	<External Org POC> <Phone 555-555-5555>	<Enter Connection Security>	Choose an item.	<Information Transmitted>	<Port/Circuit Numbers>
<SP IP Address/interface>	<External Org/IP>	<External Org POC> <Phone 555-555-5555>	<Enter Connection Security>	Choose an item.	<Information Transmitted>	<Port/Circuit Numbers>
<SP IP Address/interface>	<External Org/IP>	<External Org POC> <Phone 555-555-5555>	<Enter Connection Security>	Choose an item.	<Information Transmitted>	<Port/Circuit Numbers>

The remarks fields are *Markup multiline*, which enables the text to be formatted. This requires special handling. See *Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL*, or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

Table 13-3. CA-3 Authorized Connections

Authorized Connections Information System Name	Name of Organization CSP Name System Connects To	Role and Name of Person Who Signed Connection Agreement	Name and Date of Interconnection Agreement
<Authorized Connections System Name>	<Name Org CSP System Connects To>	<Role and Name Signed Connection Agreement>	<Name and Date of Interconnection Agreement>
<Authorized Connections System Name>	<Name Org CSP System Connects To>	<Role and Name Signed Connection Agreement>	<Name and Date of Interconnection Agreement>
<Authorized Connections System Name>	<Name Org CSP System Connects To>	<Role and Name Signed Connection Agreement>	<Name and Date of Interconnection

NIST has consolidated OSCAL syntax and is now handling interconnections as components. This is a change from the SSP Syntax in Milestone Release 2.

Some ICA FedRAMP extensions may become part of the core OSCAL syntax when OSCAL 1.0.0 is released.

## 4.25. System Interconnections and Authorized Connections (Representation)

Table 11-1 and Table 13-3 are closely related and modeled together in OSCAL.

### Representation

```
<metadata>
 <!-- oscal-version, prop -->
 <role id="isa-poc-remote"><!-- cut --></role>
 <role id="isa-poc-local"><!-- cut --></role>
 <role id="isa-authorizing-official-remote"><!-- cut --></role>
 <role id="isa-authorizing-official-local"><!-- cut --></role>
 <party uuid="uid-of-isa-remote-org" type="organization">
 <party-name>Remote System's Org</party-name>
 </party>
 <party uuid="uid-of-isa-remote-poc" type="person">
 <party-name>Remote POC's Name</party-name>
 <org-name>[SAMPLE] Remote Org Name</org-name>
 <email>person@ica.org.example</email>
 <phone>202-555-1212</phone>
 <member-of-organization>uid-of-isa-remote-org</member-of-organization>
 </party>
</metadata>
<!-- import-profile, system-characteristics -->
<component uuid="uid-of-service" component-type="service">
 <title>[EXAMPLE] Authorized Connection System Name</remote-system-name>
 <prop name="service-processor" ns="https://fedramp.gov/ns/oscal">Telco Name</prop>
 <prop name="ipv4-address" class="local" ns="https://fedramp.gov/ns/oscal">10.1.1.1</prop>
 <prop name="ipv4-address" class="remote" ns="https://fedramp.gov/ns/oscal">10.2.2.2</prop>
 <prop name="direction" ns="https://fedramp.gov/ns/oscal">incoming-outgoing</prop>
 <prop name="information" ns="https://fedramp.gov/ns/oscal">string</prop>
 <prop name="port" ns="https://fedramp.gov/ns/oscal">string</prop>
 <prop name="circuit" ns="https://fedramp.gov/ns/oscal">string</prop>
 <annotation name="connection-security" ns="https://fedramp.gov/ns/oscal" value="ipsec">
 <remarks><p>If "other", remarks are required. Optional otherwise.</p></remarks>
 </annotation>
 <link href="#uid-of-ica-resource-1" rel="agreement" />
 <responsible-role role-id="isa-poc-remote">
 <party-uuid>uid-of-isa-poc</party-uuid>
 </responsible-role>
 <remarks><p>Optional notes about this interconnection</p></remarks>
</interconnection>
<!-- repeat interconnection assembly for each ICA -->
<!-- control-implementation -->
<back-matter>
 <resource uuid="uid-of-ica-resource-1">
 <title>[SAMPLE] Interconnection Security Agreement Title</title>
 <prop name="publication" ns="https://fedramp.gov/ns/oscal">Date</prop>
 <prop name="version" ns="https://fedramp.gov/ns/oscal">Document Version</prop>
 </resource>
 <!-- repeat resource assembly for each ICA docum-->
<back-matter>
```

**NIST-Defined Identifier**  
Required Role ID:

- isa-poc-remote

**FedRAMP Extension**  
prop  
(ns="https://fedramp.gov/ns/oscal"):

- name="publication"

### XPath Queries

SEE NEXT PAGE

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE		Version #., Date												
CSP Name   Information System Name														
<b>13.1. Access Control (AC)</b>														
AC-1 Access Control Policy and Parameter Assignments (H)														
<p>The organization:</p> <p><b>NIST control requirement statements</b></p> <p>(a) Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]:</p> <p>(1) An access control policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and</p> <p>(2) Procedures to facilitate the implementation of the access control policy and associated access controls; and</p> <p><b>FedRAMP additional requirement statements</b></p> <p>(1) An access control policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and</p> <p>(2) Procedures to facilitate the implementation of the access control policy and associated access controls; and</p> <p><b>NIST parameter labels</b></p> <p>(2) Procedures to facilitate the implementation of the access control policy and associated access controls; and</p> <p><b>FedRAMP parameter constraints</b></p> <p>(b) Reviews and updates the current:</p> <p>(1) Access control policy [FedRAMP Assignment: at least annually]; and</p> <p>(2) Access control procedures [FedRAMP Assignment: at least annually or whenever a significant change occurs].</p>														
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## 5. SECURITY CONTROLS

This section describes the modeling security control information in an OSCAL-based FedRAMP SSP. To ensure consistent processing, FedRAMP imposes specific requirements on the use of OSCAL for control implementation information.

The modeling of controls is addressed on the following pages in four separate sections as follows:

- **Control Definitions**
- **Responsible Roles and Parameter Assignments**
- **Implementation Status**
- **Control Origination**
- **Implementation Descriptions**

**FEDRAMP SYSTEM SECURITY PLAN (SSP) \_\_\_\_\_ BASELINE TEMPLATE**

CSP Name | Information System Name Version #., Date

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**AC-8 System Use Notification (L) (M) (H)**

The information system:

- (a) Displays to users [Assignment: organization-defined system use notification message or banner (FedRAMP Assignment: see additional Requirements and Guidance)] before granting access to the system that provides privacy and security notices consistent with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance and states that:
  - (1) Users are accessing a U.S. Government information system;
  - (2) Information system usage may be monitored, recorded, and subject to audit;
  - (3) Unauthorized use of the information system is prohibited and subject to criminal and civil penalties; and
  - (4) Use of the information system indicates consent to monitoring and recording;
- (b) Retains the notification message or banner on the screen until users acknowledge the usage conditions and take explicit actions to log on to or further access the information system; and
- (c) For publicly accessible systems:
  - (1) Displays system use information [Assignment: organization-defined conditions (FedRAMP Assignment: see additional Requirements and Guidance)], before granting further access;
  - (2) Displays references, if any, to monitoring, recording, or auditing that are consistent with privacy accommodations for such systems that generally prohibit those activities; and
  - (3) Includes a description of the authorized uses of the system.

**AC-8 Additional FedRAMP Requirements and Guidance:**

**Requirement:** The service provider shall determine elements of the cloud environment that require the System Use Notification control. The elements of the cloud environment that require System Use Notification are approved and accepted by the JAB/AO.

**Requirement:** The service provider shall determine how System Use Notification is going to be verified and provide appropriate periodicity of the check. The System Use Notification verification and periodicity are approved and accepted by the JAB/AO.

**Guidance:** If performed as part of a Configuration Baseline check, then the % of items requiring setting that are checked and that pass (or fail) check can be provided.

**Requirement:** If not performed as part of a Configuration Baseline check, then there must be documented agreement on how to provide results of verification and the necessary periodicity of the verification by the service provider. The documented agreement on how to provide verification of the results are approved and accepted by the JAB/AO.

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## 5.1. Control Definitions

All control definition information is imported from the appropriate FedRAMP profile (baseline). This includes the original NIST control definition and parameter labels, as well as any FedRAMP requirement additions, and parameter constraints.

Interpreting and presenting profile content is beyond the scope of this document. Please refer to the NIST OSCAL Profile and Catalog schema references for more information:

- [Profile Model](#)
- [Catalog Reference](#)

Only the control implementation information is present within an OSCAL-based SSP. Each control in the FedRAMP baseline must have a corresponding implemented-requirement assembly in the control-implementation assembly.

### Representation

```
<!-- metadata -->
<import-profile href="https://path/to/xml/FedRAMP_MODERATE-baseline_profile.xml"/>
<!-- system-characteristics -->
<!-- system-implementation -->
<control-implementation>
 <description>
 <p>FedRAMP SSP Template Section 13</p>
 <p>Description field required by OSCAL.</p>
 <p>FedRAMP requires no specific content here.</p>
 </description>
 <implemented-requirement uuid="uuid-value" control-id="ac-1">
 <!-- Control content cut - See next pages for detail -->
 </implemented-requirement>
 <implemented-requirement uuid="uuid-value" control-id="ac-2" />
 <!-- Control content cut - See next pages for detail -->
 </implemented-requirement>
 <implemented-requirement uuid="uuid-value" control-id="ac-2.1" />
 <!-- Control content cut - See next pages for detail -->
 </implemented-requirement>
 <!-- cut -->
</control-implementation>
<!-- back-matter -->
```

### XPath Queries

URI to Profile:  
/\*/import-profile/@href

Replace "ac-1" with target control ID.

CSP's Control Implementation Information  
/\*/control-implementation/implemented-requirement[@control-id="ac-1"]

### NOTE:

- FedRAMP tools check to ensure there is one implemented-requirement assembly for each control identified in the FedRAMP baseline.
- The OSCAL syntax requires the `description` field at the start of the `control-implementation` assembly. FedRAMP requires no specific information here at this time.

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## 5.2. Responsible Roles and Parameter Assignments

Every control must have at least one `responsible-role` defined. There must be a separate `responsible-role` assembly for each responsible role. OSCAL requires the specified `role-id` to be valid in the defined list of roles in the metadata.

FedRAMP further requires the specified `role-id` must also have been referenced in the `system-implementation/user` assembly. This equates to the FedRAMP requirement of all responsible roles appearing in the Personnel Roles and Privileges table.

There must be one `set-parameter` statement for each of the control's parameters, as specified in the FedRAMP baseline. The only exception to this is with nested parameters. Some Select parameters contain an assignment parameter within them, such as appears in AC-7 (b). In these instances, only the final selected value must be provided. The nested assignment parameter may be ignored.

### Representation

```

<metadata>
 <role id="admin-unix">
 <title>Unix Administrator</title>
 <desc>This is a sample role.</desc>
 </role>
</metadata>

<!-- Fragment: -->
<system-implementation>
 <user uuid="uuid-value">
 <role-id>admin-unix</role-id>
 </user>
</system-implementation>

<!-- system-implementation -->
<control-implementation>
 <implemented-requirement uuid="uuid-value" control-id="ac-2">
 <!-- cut -->
 <responsible-role role-id="admin-unix" />
 <set-param param-id="ac-1_prm_a">
 <value>System Manager, System Architect, ISSO</value>
 </set-param>
 <!-- cut -->
 </control-implementation>
 <!-- back-matter -->

```

### XPath Queries

Replace "ac-2" with target control ID.

Number of specified Responsible Roles:  
`count(//*[@control-implementation/implemented-requirement[@control-id="ac-2"]]/responsible-role)`

Replace "[1]" with "[2]", "[3]", etc.

Responsible Role:  
`/*/metadata/role[@id=/*/control-implementation/implemented-requirement[@control-id="ac-1"]]/responsible-role[1]/@role-id]/title`

Check for existence in Personnel Roles and Privileges (Should return a number > 0)  
`count(//*[@system-implementation/user/role-id[string(.)=/*/control-implementation/implemented-requirement[@control-id="ac-2"]]/responsible-role/@role-id])`

Parameter Value:  
`/*/control-implementation/implemented-requirement[@control-id="ac-2"]]/set-param[@param-id="ac-2_prm_1"]/value`

Replace "ac-2\_prm\_1" with target parameter ID.

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### 5.3. Implementation Status

FedRAMP only accepts only one of five values for `implementation-status`: `implemented`, `partial`, `planned`, `alternative`, and `not-applicable`. A control may be marked "partial" and "planned" (using two separate `implementation-status` fields). All other choices are mutually exclusive.

If the `implementation-status` is `partial`, the gap must be explained in the `remarks` field.

If the `implementation-status` is `planned`, a brief description of the plan to address the gap, including major milestones must be explained in the `remarks` field. There must also be a `prop (name="planned-completion-date" ns="https://fedramp.gov/ns/oscal")` field containing the intended completion date.

If the `implementation-status` is `alternative`, the alternative implementation must be summarized in the `remarks` field.

If the `implementation-status` is `not-applicable`, the N/A justification must be provided in the `remarks` field.

#### Implementation Status Representation

```
<!-- system-implementation -->
<control-implementation>
 <implemented-requirement uuid="uuid-value" control-id="ac-1">
 <prop name="planned-completion-date" ns="https://fedramp.gov/ns/oscal">
 2021-01-01Z</prop>
 <annotation name="implementation-status" ns="https://fedramp.gov/ns/oscal" value="implemented" />
 <annotation name="implementation-status" ns="https://fedramp.gov/ns/oscal" value="partial" />
 <remarks><p>Describe the unsatisfied gap.</p></remarks>
 </annotation>
 <annotation name="implementation-status" ns="https://fedramp.gov/ns/oscal" value="planned" />
 <remarks><p>Describe the plan to complete the implementation.</p></remarks>
 </annotation>
 <annotation name="implementation-status" ns="https://fedramp.gov/ns/oscal" value="not-applicable" />
 <remarks><p>Justification for marking control Not Applicable.</p></remarks>
 </annotation>
 </!-- responsible-role -->
</control-implementation>
<!-- back-matter -->
```

#### Implementation Status XPath Queries

Implementation Status (may return more than 1 result for a given control):  
`/*control-implementation/implemented-requirement[@control-id="ac-1"]/prop[@name="implementation-status"] [not(@ns)]`

Gap Description (If `implementation-status="partial"`):  
`/*control-implementation/implemented-requirement[@control-id="ac-1"]/annotation[@name="partial"] [@ns="https://fedramp.gov/ns/oscal"]/remarks`

Planned Completion Date (If `implementation-status="planned"`):  
`/*control-implementation/implemented-requirement[@control-id="ac-1"]/prop[@name="planned-completion-date"] [@ns="https://fedramp.gov/ns/oscal"]`

Plan for Completion (If `implementation-status="planned"`):  
`/*control-implementation/implemented-requirement[@control-id="ac-1"]/annotation[@name="planned"] [@ns="https://fedramp.gov/ns/oscal"]/remarks`

Not Applicable (N/A) Justification (If `implementation-status="na"`):  
`/*control-implementation/implemented-requirement[@control-id="ac-1"]/annotation[@name="na"] [@ns="https://fedramp.gov/ns/oscal"]/remarks`

Replace  
"ac-1" with  
target  
control-id.

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE																	
CSP Name   Information System Name	Version #., Date																
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<p>The <b>remarks</b> fields are <i>Markup multiline</i>, which enables the text to be formatted. This requires special handling. See <a href="#">Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL</a>, or visit: <a href="https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline">https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline</a></p>																	

## 5.4. Control Origination

FedRAMP accepts only one of five values for `control-origination`: `sp-corporate`, `sp-system`, `customer-configured`, `customer-provided`, and `inherited`. Hybrid choices are now expressed by identifying more than one `control-origination`, each in a separate annotation field.

For controls with a `control-id` ending in "-1", FedRAMP only accepts `sp-corporate`, and `sp-system`.

If the control origination is `inherited`, there must also be a `prop(name="leveraged-authorization" ns="https://fedramp.gov/ns/oscal")` field containing the Leveraged Authorization ID of the appropriate system as it appears in the `/*/system-characteristics/leveraged-authorization` assembly.

### Control Origination Representation

```
<system-characteristics>
 <!-- status -->
 <leveraged-authorization id="lva-1" name="NCName">
 <!-- details cut -- see Leveraged Authorizations Section -->
 </leveraged-authorization>
</system-characteristics>
<!-- system-implementation -->
<control-implementation>
 <implemented-requirement uuid="uuid-value" control-id="ac-2">
 <prop name="leveraged-authorization-id" ns="https://fedramp.gov/ns/oscal">
 lva-1</prop>
 <annotation name="control-origination" ns="https://fedramp.gov/ns/oscal" value="sp-corporate" />
 <annotation name="control-origination" ns="https://fedramp.gov/ns/oscal" value="sp-system" />
 <annotation name="control-origination" ns="https://fedramp.gov/ns/oscal" value="customer-configured" />
 <annotation name="control-origination" ns="https://fedramp.gov/ns/oscal" value="inherited" />
 <!-- responsible-role -->
</control-implementation>
<!-- back-matter -->
```

### XPath Queries

Replace "ac-2" with target control-id.

Number of Control Originations:  
`count(/*/control-implementation/implemented-requirement[@control-id="ac-2"])/annotation[@name="control-origination"][@ns="https://fedramp.gov/ns/oscal"])`

Control Origination (could return more than 1 result):  
`/*/control-implementation/implemented-requirement[@control-id="ac-2"]/annotation[@name="control-origination"][@ns="https://fedramp.gov/ns/oscal"] [1]/@value`

Inherited From: System Name (If `control-origination="inherited"`):  
`/*/system-characteristics/leveraged-authorization[@id=/*/control-implementation/implemented-requirement[@control-id="ac-2"]]/prop[@name="leveraged-authorization-id"][@ns="https://fedramp.gov/ns/oscal"]]/annotation[@name="system-name"][@ns="https://fedramp.gov/ns/oscal"]/@value`

Replace "[1]" with "[2]", "[3]", etc.

Inherited From: Authorization Date (If `control-origination="inherited"`):  
`/*/system-characteristics/leveraged-authorization[@id=/*/control-implementation/implemented-requirement[@control-id="ac-2"]]/prop[@name="leveraged-authorization-id"][@ns="https://fedramp.gov/ns/oscal"]]/date-authorized`

<b>Policy and Procedure Statements</b>																							
<p>The organization:</p> <ul style="list-style-type: none"> <li>(a) Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]:           <ul style="list-style-type: none"> <li>(1) An access control policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and</li> <li>(2) Procedures to facilitate the implementation of the access control policy and associated access controls; and</li> </ul> </li> <li>(b) Reviews and updates the current:           <ul style="list-style-type: none"> <li>(1) Access control policy [FedRAMP Assignment: at least annually]; and</li> <li>(2) Access control procedures [FedRAMP Assignment: at least annually or whenever a significant change occurs].</li> </ul> </li> </ul>																							
<p><b>AC-1 What is the solution and how is it implemented?</b></p> <table border="1"> <tr> <td><b>Part a</b></td> <td></td> </tr> <tr> <td><b>Part b1</b></td> <td></td> </tr> <tr> <td><b>Part b2</b></td> <td></td> </tr> </table>		<b>Part a</b>		<b>Part b1</b>		<b>Part b2</b>																	
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<p><b>Multi-Part Statements</b></p> <p>The organization:</p> <ul style="list-style-type: none"> <li>(a) Identifies and selects the following types of information system accounts to support organizational missions/business functions: [Assignment: organization-defined information system account types];</li> <li>(b) Assigns account managers for information system accounts;           <ul style="list-style-type: none"> <li>cut c, d, e, f, g, h, i</li> </ul> </li> <li>(j) Reviews accounts for compliance with account management requirements [FedRAMP Assignment: monthly for privileged accessed, every six (6) months for non-privileged access]; and</li> <li>(k) Establishes a process for reissuing shared/group account credentials (if deployed) when individuals are removed from the group.</li> </ul>																							
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<p><b>Single Statement</b></p> <p>The organization employs automated mechanisms to support the management of information system accounts.</p> <p><b>AC-2 (I) What is the solution and how is it implemented?</b></p> <table border="1"> <tr> <td></td> </tr> </table>																							

## 5.5. Control Implementation Description: Overview

The OSCAL file must contain one implemented-requirement assembly for each part specified in the existing FedRAMP SSP Templates. For most controls and control enhancements in the FedRAMP Baselines based on NIST SP 800-53, Revision 4, this translates as follows:

- Policy and Procedure Statements
- Multi-Part Statements
- Single Statements

### 5.5.1. Policy and Procedure Statements

For each of the -1 controls, such as AC-1, there must be exactly three statements: Part (a), Part (b)(1) and Part (b)(2).

#### Policy and Procedure Representation

```
<!-- system-implementation -->
<control-implementation>
 <!-- cut -->
 <implemented-requirement uuid="uuid-value" control-id="ac-1">
 <statement statement-id="ac-1_stmt.a"><!-- cut --></statement>
 <statement statement-id="ac-1_stmt.b.1"><!-- cut --></statement>
 <statement statement-id="ac-1_stmt.b.2"><!-- cut --></statement>
 </control-implementation>
<!-- back-matter -->
```

### 5.5.2. Multi-Part Statements:

If there are outlined parts in the control requirement (a., b., etc.), such as with AC-2, the `statement-id` points to the first-level, lettered statements (`statement-id="ac-2_smt.a"`), and there must be one for each lettered statement. With the exception of Policy and Procedure Statements above, FedRAMP does not currently require responses at the sub-part level.

#### Multi-Part Statement Representation

```
<!-- system-implementation -->
<control-implementation>
 <!-- cut -->
 <implemented-requirement uuid="uuid-value" control-id="ac-2">
 <statement statement-id="ac-2_stmt.a"><!-- cut --></statement>
 <statement statement-id="ac-2_stmt.b"><!-- cut --></statement>
 <!-- cut c, d, e, f, g, h, i -->
 <statement statement-id="ac-2_stmt.j"><!-- cut --></statement>
 <statement statement-id="ac-2_stmt.k"><!-- cut --></statement>
 </control-implementation>
<!-- back-matter -->
```

### 5.5.3. Single Statement

If there are no outlined parts in the control requirement (no a, b, etc.), such as with AC-2 (1), the `control-id` points to the top-level statement (`control-id="ac-2.1_smt"`), and there must be exactly one.

#### Single-Statement Representation

```
<!-- system-implementation -->
<control-implementation>
 <!-- cut -->
 <implemented-requirement control-id="ac-2.1">
 <statement statement-id="ac-2.1_stmt"><!-- cut --></statement>
 </control-implementation>
<!-- back-matter -->
```

FedRAMP may change this when NIST SP 800-53 Revision 5 is published in 2020.

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE																																									
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## 5.6. Control Implementation Description: Approaches

OSCAL makes two approaches available for control implementation descriptions at the statement level:

- **Flat-File Approach:** Similar to today's FedRAMP SSPs, where the entire control description for each part is kept together, regardless of its implementation point; and
- **Component-Based Approach:** The control description for each part is broken down and described based on its relevant component.

**FedRAMP SSP tools must support both approaches.** FedRAMP prefers the component-based approach, but will accept the flat-file approach to aid existing CSPs who are converting existing MS-Word based FedRAMP SSPs to OSCAL.

With the **flat-file approach**, all of the content in the cell next to *Part a* appears in a single OSCAL file, just as it does in today's FedRAMP SSP templates.

AC-2 What is the solution and how is it implemented?		
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A mix of approaches is also acceptable. For example, a CSP may wish to keep the flat-file approach for the Policy and Procedure (-1) controls, but use a component-based approach for technical controls or controls with a customer responsibility.

FEDRAMP SYSTEM SECURITY PLAN (SSP) _____ BASELINE TEMPLATE																													
CSP Name   Information System Name	Version #., Date																												
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<p><b>The organization:</b></p> <p>(a) Develops, documents, and disseminates to [Assignment: organization-defined personnel or roles]:</p> <ul style="list-style-type: none"> <li>(1) An access control policy that addresses purpose, scope, roles, responsibilities, management commitment, coordination among organizational entities, and compliance; and</li> <li>(2) Procedures to facilitate the implementation of the access control policy and associated access controls; and</li> </ul> <p>(b) Reviews and updates the current:</p> <ul style="list-style-type: none"> <li>(1) Access control policy [FedRAMP Assignment: at least annually]; and</li> <li>(2) Access control procedures [FedRAMP Assignment: at least annually or whenever a significant change occurs].</li> </ul>																													
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### 5.6.1. Flat-File Approach

The flat-file approach enables a CSP to simply represent the content of each cell in the table to the right as an individual part

#### Representation

```
<!-- system-implementation -->
<control-implementation>
 <!-- cut -->
 <implemented-requirement uuid="uuid-value" control-id="ac-1">
 <statement uuid="uuid-value" statement-id="ac-1_stmt.a">
 <description><p>Implementation Description for Part a.</p></description>
 </statement>
 <statement uuid="uuid-value" statement-id="ac-1_stmt.b.1">
 <description><p>Implementation Description for Part b, 1.</p></description>
 </statement>
 <statement uuid="uuid-value" statement-id="ac-1_stmt.b.2">
 <description><p>Implementation Description for Part b, 1.</p></description>
 </statement>
 </control-implementation>
 <!-- back-matter -->
```

#### XPath Queries

```
AC-1 What is the solution and how is it implemented?, Part (a):
/*/control-implementation/implemented-requirement[@control-id="ac-1"]/statement
[@statement-id="ac-1_stmt.a"]/description

AC-1 What is the solution and how is it implemented?, Part (b1):
/*/control-implementation/implemented-requirement[@control-id="ac-1"]/statement
[@statement-id="ac-1_stmt.b.1"]/description

AC-1 What is the solution and how is it implemented?, Part (b2):
/*/control-implementation/implemented-requirement[@control-id="ac-1"]/statement
[@statement-id="ac-1_stmt.b.2"]/description
```

#### NOTES:

- All **statement-id** values must be cited as they appear in the NIST SP 800-53, Revision 4 OSCAL catalog: [https://raw.githubusercontent.com/usnistgov/OSCAL/master/content/nist.gov/SP800-53/rev4/xml/NIST\\_SP-800-53\\_rev4\\_catalog.xml](https://raw.githubusercontent.com/usnistgov/OSCAL/master/content/nist.gov/SP800-53/rev4/xml/NIST_SP-800-53_rev4_catalog.xml)
- If using the flat-file approach, and the control origination indicates **customer-provided**, or **customer-configured**, the content in the remarks for control-origination must be sufficient to satisfy the customer-responsibility-matrix (CRM).

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### 5.6.2. Component Approach

Within each of the statement assemblies, FedRAMP prefers all responses appear in one of three by-component assemblies as follows:

- **Service Provider Origin** (component-id="comp-system"): Describe **how** the cloud service provider is satisfying the control requirement.
- **Inherited** (component-id="comp-fedramp-authorized-provider-1"): Describe what is being inherited from a leveraged authorization. If there is more than one leveraged authorization (not typical), be sure to define a component for each underlying system and use the correct component-id here. If this specific statement is inheriting from more than one provider, list each as a separate by-component assembly.
- **Customer Responsibility** (component-id="comp-customer"): Describe any customer responsibilities here.

#### Representation

```
<!-- system-implementation -->
<control-implementation>
 <!-- cut -->
 <implemented-requirement uuid="uuid-value" control-id="ac-2">
 <statement uuid="uuid-value" statement-id="ac-2_stmt.a">
 <description><p>Descriptions appear in by-component section(s)</p></description>
 <!-- Service Provider Responsibility -->
 <by-component uuid="uuid-value" component-id="comp-system">
 <description>
 <p>How is the service provider satisfying the control</p>
 </description>
 </by-component>
 <!-- Inherited -->
 <by-component uuid="uuid-value" component-id="comp-fedramp-authorized-provider-1">
 <description><p>What is inherited?</p></description>
 </by-component>
 <!-- Customer Responsibility -->
 <by-component uuid="uuid-value" component-id="comp-customer">
 <description>
 <p>What must the customer configure or provide?</p>
 <p>This will appear in the Customer Responsibility Matrix.</p>
 </description>
 </by-component>
 </statement>
 <!-- repeat statement assembly for statement part as needed. -->
 </control-implementation>
 <!-- back-matter -->
```

#### XPath Queries

[SEE NEXT PAGE](#)

#### NOTES:

- All statement-id values must be cited as they appear in the NIST SP 800-53, Revision 4 OSCAL catalog: [https://raw.githubusercontent.com/usnistgov/OSCAL/master/content/nist.gov/SP800-53/rev4/xml/NIST\\_SP-800-53\\_rev4\\_catalog.xml](https://raw.githubusercontent.com/usnistgov/OSCAL/master/content/nist.gov/SP800-53/rev4/xml/NIST_SP-800-53_rev4_catalog.xml)
- Tool vendors should expect to see this component approach expand in the future and may want to design tools with this in mind. Contact the NIST OSCAL Team ([oscal@nist.gov](mailto:oscal@nist.gov)) or the FedRAMP PMO ([info@fedramp.gov](mailto:info@fedramp.gov)) for more information.
- If using the component-based approach, and the control origination indicates customer-provided, or customer-configured the customer component must be used to capture the customer's responsibility for each part, sufficient to satisfy the customer responsibility matrix.

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### 5.6.3. XPath Queries for Control Implementation Descriptions

#### XPath Queries

AC-2 What is the solution and how is it implemented?, Part (a):  
`/*/control-implementation/implemented-requirement[@control-id="ac-2"]/  
statement[@statement-id="ac-2_stmt.a"]/by-component[@component-id="comp-system"]/  
description`

Replace "ac-2" with target control-id.

Description of WHAT is Inherited:  
`/*/control-implementation/implemented-requirement[@control-id="ac-2"]/  
statement[@statement-id="ac-2_stmt.a"]/by-component[@component-id=  
"comp-fedramp-authorized-provider-1"]/description`

Replace "ac-2\_stmt.a" with target control statement-id.

Description of Customer Responsibilities:  
`/*/control-implementation/implemented-requirement[@control-id="ac-2"]/  
statement[@statement-id="ac-2_stmt.a"]/by-component[@component-id="comp-customer"]/  
description`

**FEDRAMP SYSTEM SECURITY PLAN (SSP) \_\_\_\_\_ BASELINE TEMPLATE**

CSP Name | Information System Name

Version #., Date

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## 15. ATTACHMENTS

A recommended attachment file naming convention is <information system abbreviation> <attachment number> <document abbreviation> <version number> (for example, "Information System Abbreviation A8 IRP v1.0"). Use this convention to generate names for the attachments. Enter the appropriate file names and file extensions in Table 15-1 to describe the attachments provided. Make only the following additions/changes to Table 15-1:

- The first item, Information Security Policies and Procedures (ISPP), may be fulfilled by multiple documents. If that is the case, add lines to Table 15-1. to differentiate between them using the "xx" portion of the File Name. *Example* Enter Information System Abbreviation A1 ISPP xx v1.0. Delete the "xx" if there is only one document.
- Enter the file extension for each attachment.
- Do not change the Version Number in the File Name in Table 15-1. . (Information System Abbreviation, attachment number, document abbreviation, version number)

*Table 15-1. Names of Provided Attachments*

Attachment	File Name	File Extension
Information Security Policies and Procedures	Enter Information System Abbreviation A1 ISPP xx v1.0	.enter extension
User Guide	Enter Information System Abbreviation A2 UG v1.0	.enter extension
Digital Identity Worksheet	Included in Section 15	
PTA	Included in Section 15	
PIA (if needed)	Enter Information System Abbreviation A4 PIA v1.0	.enter extension
Rules of Behavior	Enter Information System Abbreviation A5 ROB v1.0	.enter extension
Information System Contingency Plan	Enter Information System Abbreviation A6 ISCP v1.0	.enter extension
Configuration Management Plan	Enter Information System Abbreviation A7 CMP v1.0	.enter extension
Incident Response Plan	Enter Information System Abbreviation A8 IRP v1.0	.enter extension
CIS Workbook	Enter Information System Abbreviation A9 CIS Workbook v1.0	.enter extension
FIPS 199	Included in Section 15	
Inventory	Enter Information System Abbreviation A13 INV v1.0	.enter extension

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## 6. ATTACHMENTS

Classic FedRAMP attachments include a mix of items. Some lend well to machine-readable format, while others do not. Machine-readable content is typically addressed within the OSCAL-based FedRAMP SSP syntax, while policies, procedures, plans, guidance, and the rules of behavior documents are all treated as classic attachments, as described in the *Citations, Attachments, and Embedded Content in OSCAL Files* Section. The following table describes how each attachment is handled:

ATTACHMENT	MACHINE READABLE	HOW TO HANDLE
Policies and Procedures	No	Attach using the <a href="#">back-matter, resource</a> syntax.  Use <code>resource id="att-policy-1"</code> for policies, and set type to "policy".  Use <code>resource id="att-procedure-1"</code> for procedures, and set type to "procedure".
User Guide	No	Attach using the <a href="#">back-matter, resource</a> syntax.  Use <code>resource id="att-guide-1"</code> for guides, and set type to "guide".
Digital Identity Worksheet	Yes	Incorporated above. See the <i>Digital Identity Determination</i> Section.
Privacy Threshold Analysis (PTA)	Yes	Incorporated into System Information. See the <i>Privacy Impact Assessment</i> Section.
Privacy Impact Assessment (PIA)	No (Future)	Attach using the <a href="#">back-matter, resource</a> syntax. Use <code>resource id="att-pia"</code> . FedRAMP intends to incorporate machine-readable PIA content into the OSCAL-based FedRAMP SSP at a later date.
Rules of Behavior	No	Attach using the <a href="#">back-matter, resource</a> syntax. Use <code>resource id="att-rob"</code> for procedures, and set type to "rob".
Information System Contingency Plan	No	Attach using the <a href="#">back-matter, resource</a> syntax. Use <code>resource id="att-plan-cp"</code> for procedures, and set type to "plan".
Configuration Management Plan	No	Attach using the <a href="#">back-matter, resource</a> syntax. Use <code>resource id="att-plan-cm"</code> for procedures, and set type to "plan".
Incident Response Plan	No	Attach using the <a href="#">back-matter, resource</a> syntax. Use <code>resource id="att-plan-ir"</code> for procedures, and set type to "plan".
CIS Workbook	Yes	This can be generated from the content in the Security Controls section and no longer needs to be maintained separately or attached.
FIPS-199	Yes	Incorporated above. See the <i>Security Objectives Categorization (FIPS-199)</i> Section.
Inventory	Yes	See the <i>System Inventory</i> Section below.

**FEDRAMP SYSTEM SECURITY PLAN (SSP) \_\_\_\_\_ BASELINE TEMPLATE**

CSP Name | Information System Name Version #., Date

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## 15. ATTACHMENTS

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Inventory	Enter Information System Abbreviation A13 INV v1.0	.enter extension

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## 6.1. Attachments

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\*\*\*\*\* Need to address conformity tags in required attachment resources.

Attachment Representation
<pre>&lt;!-- cut --&gt; &lt;back-matter&gt;   &lt;resource uuid="<b>uuid-value</b>"&gt;     &lt;desc&gt;Policy document&lt;/desc&gt;     &lt;prop name="type" ns="https://fedramp.gov/ns/oscal"&gt;policy&lt;/prop&gt;     &lt;prop name="title" ns="https://fedramp.gov/ns/oscal"&gt;Document Title&lt;/prop&gt;     &lt;prop name="publication" ns="https://fedramp.gov/ns/oscal"&gt;Document Date&lt;/prop&gt;     &lt;prop name="version" ns="https://fedramp.gov/ns/oscal"&gt;Document Version&lt;/prop&gt;     &lt;!-- Add rlink with relative path or embed with base64 encoding --&gt;     &lt;base64&gt;00000000&lt;/base64&gt;   &lt;/resource&gt;   &lt;resource uuid="<b>uuid-value</b>" /&gt;   &lt;!-- cut: policies 3 - 13 --&gt;   &lt;resource uuid="<b>uuid-value</b>" /&gt;   &lt;resource uuid="<b>uuid-value</b>" /&gt;   &lt;!-- cut: procedure 2 - 13 --&gt; &lt;/back-matter&gt;</pre>
FedRAMP Extensions & Accepted Values
<pre>prop (ns="https://fedramp.gov/ns/oscal"):</pre> <ul style="list-style-type: none"> <li>name="type" <ul style="list-style-type: none"> <li><b>Valid:</b> policy, procedure, guide, pia, rob, plan</li> </ul> </li> <li>name="title"</li> <li>name="publication"</li> <li>name="version"</li> </ul>
XPath Queries
<p>The Number of Policies Attached:</p> <pre>count(/&gt;/back-matter/resource/prop[@name="type"] [@ns="https://fedramp.gov/ns/oscal"])[string(.)="policy"])</pre> <p>Attachment (Embedded Base64 encoded):</p> <pre>/*/back-matter/resource[@id="att-policy-1"]/base64</pre> <p>OR (Relative Link):</p> <pre>/*/back-matter/resource[@id="att-policy-1"]/rlink/@href</pre> <p>Title of First Policy Document:</p> <pre>/*/back-matter/resource/prop[@name="type"][@ns="https://fedramp.gov/ns/oscal"] [string(.)="policy"])[1]/../prop[@name="title"][@ns="https://fedramp.gov/ns/oscal"]</pre>
<p>Replace "policy" with "plan", "rob", etc. for each attachment type.</p>

## ATTACHMENT 4 PTA/PIA

This Attachment Section has been revised to include the PTA Template. Therefore, a separate PTA attachment is not needed. If any of the answers to Question 1-4 are "Yes" then complete a Privacy Impact Assessment Template and include it as an Attachment.

Delete this note and all other instructions from your final version of this document.

All Authorization Packages must include a Privacy Threshold Analysis (PTA) and if necessary, the Privacy Impact Assessment (PIA) attachment, which will be reviewed for quality.

The PTA is included in this section, and the PIA Template can be found on the following FedRAMP website page: [Templates](#).

The PTA and PIA Template includes a summary of laws, regulations and guidance related to privacy issues in **Error! Reference source not found..**

### Privacy Overview and Point of Contact (POC)

The Table 15-6. Information System Name; Privacy POC individual is identified as the Information System Name; Privacy Officer and POC for privacy at CSP Name.

**Table 15-6. Information System Name; Privacy POC**

<b>Name</b>	Click here to enter text.
<b>Title</b>	Click here to enter text.
<b>CSP / Organization</b>	Click here to enter text.
<b>Address</b>	Click here to enter text.
<b>Phone Number</b>	Click here to enter text.
<b>Email Address</b>	Click here to enter text.

## 6.2. Privacy Impact Assessment: POC

Much of the Privacy Impact Assessment (PIA) is absorbed into constructs addressed earlier in this document. The Privacy POC is handled the same as other roles. The same is true for the laws and regulations.

### Attachment Representation

```
<!-- cut -->
<metadata>
 <role id="privacy-poc">
 <title>Privacy Official's Point of Contact</title>
 <desc>The individual responsible for the PTA and if necessary the PIA.</desc>
 </role>
 <party uuid="uuid-of-csp" type="organization">
 <party-name>Cloud Service Provider (CSP) Name</party-name>
 </party>
 <party uuid="uuid-of-person-7">
 <person>
 <party-name>[SAMPLE] Person Name 7</party-name>
 <prop name="title" ns="https://fedramp.gov/ns/oscal">Individual's Title</prop>
 <address>
 <addr-line>Suite 0000</addr-line>
 <addr-line>1234 Some Street</addr-line>
 <city>Haven</city>
 <state>ME</state>
 <postal-code>00000</postal-code>
 </address>
 <email>name@org.domain</email>
 <phone>000-000-0000</phone>
 <member-of-organization>uuid-of-csp</member-of-organization>
 </person>
 </party>
 <!-- cut -->
 <responsible-party role-id="privacy-poc">
 <party-uuid>uuid-of-person-7</party-uuid>
 </responsible-party>
</role>
</metadata>
```

### NIST-Defined Identifier

Required Role ID:

- privacy-poc

### XPath Queries

Privacy POC Name:  
`/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="privacy-poc"]]/party-uuid]]/party-name`

NOTE: Replace "party-name" with "email" or "phone" above as needed.

Privacy POC's Address:  
`/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="privacy-poc"]]/party-uuid]]/address/addr-line`

NOTE: Replace "addr-line" with "city", "state", or "postal-code" above as needed.

Privacy POC's Title:  
`/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="privacy-poc"]]/party-uuid]]/prop[@name='title'][@ns='https://fedramp.gov/ns/oscal']`

Company/Organization:  
`/*/metadata/party[@uuid=[/*/metadata/party[@uuid=[/*/metadata/responsible-party[@role-id="privacy-poc"]]/party-uuid]]/member-of-organization]/party-name`

## ATTACHMENT 4 PTA/PIA

This Attachment Section has been revised to include the PTA Template. Therefore, a separate PTA attachment is not needed. If any of the answers to Question 1-4 are "Yes" then complete a Privacy Impact Assessment Template and include it as an Attachment.

Delete this note and all other instructions from your final version of this document.

All Authorization Packages must include a Privacy Threshold Analysis (PTA) and if necessary, the Privacy Impact Assessment (PIA) attachment, which will be reviewed for quality.

The PTA is included in this section, and the PIA Template can be found on the following FedRAMP website page: [Templates](#).

The PTA and PIA Template includes a summary of laws, regulations and guidance related to privacy issues in **Error! Reference source not found..**

**Table 1S-7. <Information System Name> Laws and Regulations**

Identification Number	Title	Date	Link
Click here to enter text.			
Click here to enter text.			

## 6.3. Privacy Impact Assessment: Laws and Regulations

Much of the Privacy Impact Assessment (PIA) is absorbed into constructs addressed earlier in this document. The Privacy POC is handled the same as other roles. The same is true for the laws and regulations.

### Attachment Representation

```
<!-- cut -->
<back-matter>
 <resource uuid="uuid-value">
 <title>[SAMPLE] Privacy-Related Law Citation</title>
 <prop name="type" ns="https://fedramp.gov/ns/oscal">law</prop>
 <prop name="type" ns="https://fedramp.gov/ns/oscal">pii</prop>
 <prop name="doc-id">Identification Number</prop>
 <prop name="publication" ns="https://fedramp.gov/ns/oscal">Publication Date</prop>
 <rlink href="https://domain.example/path/to/document.pdf" />
 </resource>
</back-matter>
```

### XPath Queries

Number of Privacy Laws and Regulations:

```
count((/*/back-matter/resource/prop[@name="type"][@ns="https://fedramp.gov/ns/oscal"]
[(string(.)="law") or (string(.)="regulation")])../prop[@name="type"]
[@ns="https://fedramp.gov/ns/oscal"][(string(.) = "pii"))])
```

Privacy Laws and Regulations - Identification Number:

```
((/*/back-matter/resource/prop[@name="type"][@ns="https://fedramp.gov/ns/oscal"]
[(string(.) = "law") or (string(.)="regulation")])../prop[@name="type"]
[@ns="https://fedramp.gov/ns/oscal"][(string(.) = "pii"))[1]/../prop[@name="ref-id"]
[@ns="https://fedramp.gov/ns/oscal"])
```

Laws and Regulations - Title:

```
((/*/back-matter/resource/prop[@name="type"][@ns="https://fedramp.gov/ns/oscal"]
[(string(.) = "law") or (string(.)="regulation")])../prop[@name="type"]
[@ns="https://fedramp.gov/ns/oscal"][(string(.) = "pii"))[1]/../title
```

Privacy Laws and Regulations - Date:

```
((/*/back-matter/resource/prop[@name="type"][@ns="https://fedramp.gov/ns/oscal"]
[(string(.) = "law") or (string(.)="regulation")])../prop[@name="type"]
[@ns="https://fedramp.gov/ns/oscal"][(string(.) = "pii"))[1]/..
prop[@name="publication"][@ns="https://fedramp.gov/ns/oscal"]
```

Privacy Laws and Regulations - Link:

```
((/*/back-matter/resource/prop[@name="type"][@ns="https://fedramp.gov/ns/oscal"]
[(string(.) = "law") or (string(.)="regulation")])../prop[@name="type"]
[@ns="https://fedramp.gov/ns/oscal"][(string(.) = "pii"))[1]/../rlink/@href
```

Replace "[1]" with "[2]", "[3]", etc.

## ATTACHMENT 4 PTA/PIA

This Attachment Section has been revised to include the PTA Template. Therefore, a separate PTA attachment is not needed. If any of the answers to Question 1-4 are "Yes" then complete a Privacy Impact Assessment Template and include it as an Attachment.

Delete this note and all other instructions from your final version of this document.

All Authorization Packages must include a Privacy Threshold Analysis (PTA) and if necessary, the Privacy Impact Assessment (PIA) attachment, which will be reviewed for quality.

The PTA is included in this section, and the PIA Template can be found on the following FedRAMP website page: [Templates](#).

The PTA and PIA Template includes a summary of laws, regulations and guidance related to privacy issues in **Error! Reference source not found..**

### DESIGNATION

Check one.

- A Privacy Sensitive System
- Not a Privacy Sensitive System (in its current version)

The Privacy Impact Assessment Template can be found on the following FedRAMP website page: [Templates](#).

### QUALIFYING QUESTIONS

- |            |                                                                                                                                                |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Select One | 1. Does the ISA collect, maintain, or share PII in any identifiable form?                                                                      |
| Select One | 2. Does the ISA collect, maintain, or share PII information from or about the public?                                                          |
| Select One | 3. Has a Privacy Impact Assessment ever been performed for the ISA?                                                                            |
| Select One | 4. Is there a Privacy Act System of Records Notice (SORN) for this ISA system?<br>If yes; the SORN identifier and name is: Enter SORN ID/Name. |

If answers to Questions 1-4 are all "No" then a Privacy Impact Assessment may be omitted. If any of the answers to Question 1-4 are "Yes" then complete a Privacy Impact Assessment.

## 6.4. Privacy Impact Assessment: Designation and Qualifying Questions

### Attachment Representation

```
<!-- cut -->
<system-characteristics>
 <system-information>
 <!-- Attachment 4, PTA/PIA Designation -->
 <prop name="privacy-sensitive">yes</prop>
 <!-- Does the ISA collect, maintain, or share PII in any identifiable form? -->
 <prop name="pta-1" class="pta" ns="https://fedramp.gov/ns/oscal">yes</prop>
 <!-- Does the ISA collect, maintain, share PII info from or about the public? -->
 <prop name="pta-2" class="pta" ns="https://fedramp.gov/ns/oscal">yes</prop>
 <!-- Has a Privacy Impact Assessment ever been performed for the ISA? -->
 <prop name="pta-3" class="pta" ns="https://fedramp.gov/ns/oscal">yes</prop>
 <!-- Is there a Privacy Act System of Records Notice (SORN) for this ISA system? -->
 <prop name="pta-4" class="pta" ns="https://fedramp.gov/ns/oscal">yes</prop>
 <prop name="sorn-id" class="pta" ns="https://fedramp.gov/ns/oscal">[No SORN
ID]</prop>
 <!-- information-type -->
 </system-information>
</system-characteristics>
```

### FedRAMP Extensions & Accepted Values

- prop (ns="https://fedramp.gov/ns/oscal", class="pta"):
- name="privacy-sensitive"
    - **Valid:** yes, no
  - name="pta-1"
    - **Valid:** yes, no
  - name="sorn-id"

### XPath Queries

Privacy Designation (yes = Privacy Sensitive):  
`/*/system-characteristics/system-information/prop[@name="privacy-sensitive"]`

Qualifying Question #1:  
`/*/system-characteristics/system-information/prop[@name="pta-1"][@ns="https://fedramp.gov/ns/oscal"]`

Qualifying Question #2:  
`/*/system-characteristics/system-information/prop[@name="pta-2"][@ns="https://fedramp.gov/ns/oscal"]`

Qualifying Question #3:  
`/*/system-characteristics/system-information/prop[@name="pta-3"][@ns="https://fedramp.gov/ns/oscal"]`

Qualifying Question #4:  
`/*/system-characteristics/system-information/prop[@name="pta-4"][@ns="https://fedramp.gov/ns/oscal"]`

Qualifying Question #4:  
`/*/system-characteristics/system-information/prop[@name="sorn-id"][@ns="https://fedramp.gov/ns/oscal"]`

## ATTACHMENT 13 FEDRAMP INVENTORY WORKBOOK

All Authorization Packages must the Inventory attachment, which will be reviewed for quality.

When completed, FedRAMP will accept this inventory workbook as the inventory information required by the following:

- System Security Plan
- Security Assessment Plan
- Security Assessment Report
- Information System Contingency Plan
- Initial POAM
- Monthly Continuous Monitoring (POAM or as a separate document)

The FedRAMP Inventory Workbook can be found on the following FedRAMP website page: [Templates](#).

Note: A complete and detailed list of the system hardware and software inventory is required per NIST SP 800-53, Rev 4 CM-8.

	All Inventories				
	UNIQUE ASSET IDENTIFIER	IPv4 or IPv6 Address	VIRTUAL	Public	DNS Name or URL
OS/Infrastructure Example	123.45.78.90	123.45.78.90	No	Yes	linux01.iaas.org
Software Example	123.45.78.400	123.45.78.400	No	No	
Database Example	123.45.78.401	123.45.78.401	No	No	

OS/Infrastructure Inventory								
NetBIOS Name	MAC Address	Authenticated Scan	Baseline Configuration Name	OS Name and Version	Location	Asset Type	Hardware Make/Model	In Latest Scan
linux01	00:00:00:00:00	Yes	Base Config1	CentOS 5.1	n/a	Web Server	Acme Server	No

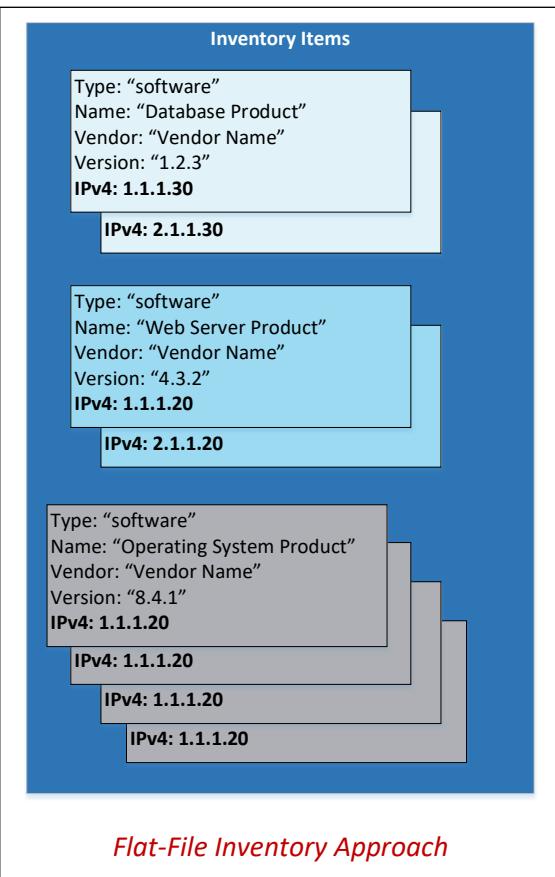
Software and Database Inventories			Any Inventory					
Software/Database Vendor	Software/Database Name & Version	Patch Level	Function	Comments	Serial #/Asset Tag#	VLAN/Network ID	System Administrator/Owner	Application Administrator/Owner
Acme Software	Acme CloudApp v1.0		CRM					
Oracle	Oracle v11		Records Management					

## 6.5. System Inventory Approach

OSCAL makes two approaches available for depicting the system inventory:

- **Flat-File Approach:** Similar to today's FedRAMP Integrated inventory workbook, where all of the information on a spreadsheet row is captured in a single assembly.
- **Component-Based Approach:** A component is defined once with as much known detail as possible, and inventory-items point to components for common information.

**FedRAMP SSP tools must support both approaches.** FedRAMP prefers the component-based approach, but will accept the flat-file approach to aid CSPs who are converting their existing MS-Excel based FedRAMP Integrated Inventory Workbook to OSCAL.



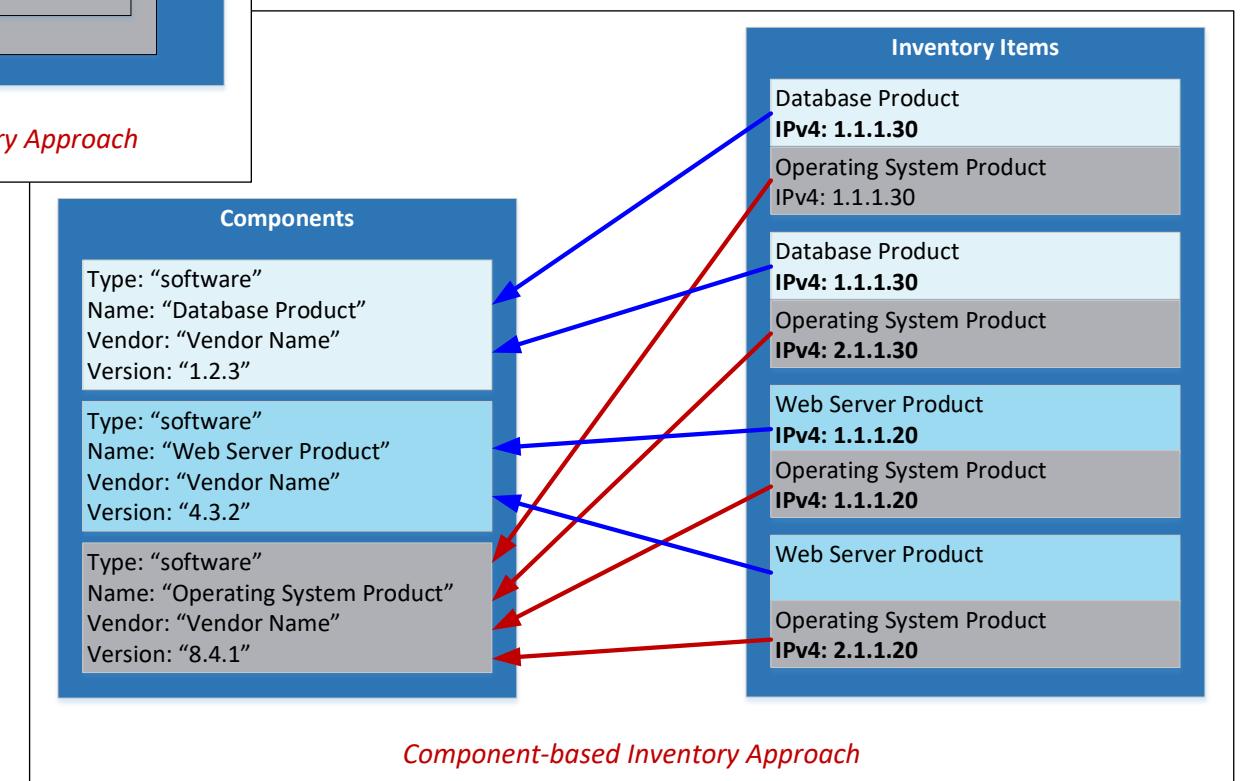
With the **flat-file approach**, all of the content on a spreadsheet row appears in a single OSCAL inventory-item assembly. The component assembly is not used. This results in a great deal of redundant information, but is a simple transition from the current spreadsheet approach.

With the **component-based approach**, common information is captured once for the component. Then each instance of that component is listed in the inventory with only the information that is unique to that component.

For example, if the same Linux operating system is used as the platform for all database and web servers, most of the details about the Linux operating system can be captured once as a component. This includes information such as vendor name, version number, and patch level.

If four Linux instances are used, each instance is an inventory item with a unique IP address and MAC address. Only those unique pieces are captured at the inventory level. All four inventory-items point back to the component for vendor name, version number, and patch level.

Initially FedRAMP will be more flexible about the CSP's inventor approach until these concepts have been applied and real-world exceptions analyzed.



## ATTACHMENT I3 FEDRAMP INVENTORY WORKBOOK

All Authorization Packages must the Inventory attachment, which will be reviewed for quality.

When completed, FedRAMP will accept this inventory workbook as the inventory information required by the following:

- System Security Plan
- Security Assessment Plan
- Security Assessment Report
- Information System Contingency Plan
- Initial POAM
- Monthly Continuous Monitoring (POAM or as a s

### FedRAMP Extensions & Accepted Values

```
prop (ns="https://fedramp.gov/ns/oscal"):
 • name="vendor-name"
 • name="scan-type"
 ○ Valid: infrastructure, web, database
 • name="validation"
```

The FedRAMP Inventory Workbook can be found on the following [FedRAMP website page](#). [Templates](#).

Note: A complete and detailed list of the system hardware and software inventory is required per NIST SP 800-53, Rev 4 CM-8.

	All Inventories			
	UNIQUE ASSET IDENTIFIER	IPv4 or IPv6 Address	Virtual	Public
OS/Infrastructure Example	123.45.78.90	123.45.78.90	No	Yes
Software Example	123.45.78.400	123.45.78.400	No	No
Database Example	123.45.78.401	123.45.78.401	No	No

### NIST Accepted Values

```
prop
 • name="virtual"
 ○ Valid: yes, no
 • name="public"
 ○ Valid: yes, no
annotation
 • name="allows-authenticated-scan"
 ○ Valid: yes, no
 • name="is-scanned"
 ○ Valid: yes, no
```

OS/Infrastructure Inventory								
NetBIOS Name	MAC Address	Authenticated Scan	Baseline Configuration Name	OS Name and Version	Location	Asset Type	Hardware Make/Model	In Latest Scan
linux01	00:00:00:00:00	Yes	Base Config1	Cent				

### FedRAMP Accepted Values

```
prop
 • name="asset-type"
 ○ Valid: os, database, web-server, dns-server, email-server, directory-server, pbx, firewall, router, switch, storage-array
Other values are allowed for now.
```

Software and Database Inventories				Any Inventory			
Software Vendor	Software Database Name & Version	Patch Level	Function	Comments	Serial #/Asset Tag#	VLAN/ Network ID	System Administrator/ Owner
Acme Software	Acme CloudApp v1.0	CPM4					
Oracle							

The description and remarks fields are *Markup multiline*, which enables the text to be formatted.

This requires special handling. See Section 2.5.3 *Markup-line* and *Markup-multiline* Fields in OSCAL, or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

## 6.5.1. Flat File Approach

### Flat-File Representation

```
<!-- cut -->
<system-implementation>
 <!-- interconnection -->
 <system-inventory>
 <inventory-item uuid="uuid-value" asset-id="unique-asset-id">
 <description><p>Flat-File Example (No implemented-component).</p></description>
 <prop name="ipv4-address">0.0.0.0</prop>
 <prop name="ipv6-address">0000:0000:0000:0000</prop>
 <prop name="virtual">no</prop>
 <prop name="public">no</prop>
 <prop name="fqdn">dns.name</prop>
 <prop name="uri">uniform.resource.identifier</prop>
 <prop name="netbios-name">netbios-name</prop>
 <prop name="mac-address">00:00:00:00:00:00</prop>
 <prop name="software-name">software-name</prop>
 <prop name="version">V 0.0.0</prop>
 <prop name="asset-type">os</prop>
 <prop name="vendor-name" ns="https://fedramp.gov/ns/oscal">Vendor Name</prop>
 <prop name="model">Model Number</prop>
 <prop name="patch-level">Patch-Level</prop>
 <prop name="serial-number">Serial #</prop>
 <prop name="asset-tag">Asset Tag</prop>
 <prop name="vlan-id">VLAN Identifier</prop>
 <prop name="network-id">Network Identifier</prop>
 <prop name="scan-type" ns="https://fedramp.gov/ns/oscal">infrastructure</prop>
 <prop name="validation" ns="https://fedramp.gov/ns/oscal">component-id</prop>
 <annotation name="allows-authenticated-scan" value="no">
 <remarks><p>If no, explain why. If yes, omit remarks field.</p></remarks>
 </annotation>
 <annotation name="baseline-configuration-name" value="Baseline Config. Name" />
 <annotation name="physical-location" value="Physical location of Asset" />
 <annotation name="is-scanned" value="yes">
 <remarks><p>If no, explain why. If yes, omit remarks field.</p></remarks>
 </annotation>
 <annotation name="function" value="Required brief, text-based description.">
 <remarks><p>Optional, longer, formatted description.</p></remarks>
 </annotation>
 <responsible-party role-id="asset-owner">
 <party-id>person-7</party-id>
 </responsible-party>
 <responsible-party role-id="asset-administrator">
 <party-id>it-dept</party-id>
 </responsible-party>
 <implemented-component component-id="comp-router-1" />
 <remarks><p>COMMENTS: Additional information about this item.</p></remarks>
 </inventory-item>
 <!-- Repeat the inventory-item assembly for each item in the inventory -->
</system-inventory>
<!-- system-implementation remarks -->
</system-implementation>
```

### NIST-Defined Identifier

Required Role ID:

- asset-owner
- asset-administrator

### XPath Queries

See Section 6.5.3, *Inventory Data Locations and XPath Queries*

### NOTES:

system administrator and application administrator are handled the same. The value of asset-type determines whether the identified asset-administrator is managing a system or application.

## ATTACHMENT I3 FEDRAMP INVENTORY WORKBOOK

All Authorization Packages must the Inventory attachment, which will be reviewed for quality.

When completed, FedRAMP will accept this inventory workbook as the inventory information required by the following:

- System Security Plan
- Security Assessment Plan
- Security Assessment Report
- Information System Contingency Plan
- Initial POAM
- Monthly Continuous Monitoring (POAM or as a s

### FedRAMP Extensions & Accepted Values

```
prop (ns="https://fedramp.gov/ns/oscal"):
 • name="vendor-name"
 • name="scan-type"
 ○ Valid: infrastructure, web, database
 • name="validation"
```

The FedRAMP Inventory Workbook can be found on the following [FedRAMP website page](#). [Templates](#).

Note: A complete and detailed list of the system hardware and software inventory is required per NIST SP 800-53, Rev 4 CM-8.

	All Inventories			
	UNIQUE ASSET IDENTIFIER	IPv4 or IPv6 Address	VIRTUAL	PUBLIC
OS/Infrastructure Example	123.45.78.90	123.45.78.90	No	Yes
Software Example	123.45.78.400	123.45.78.400	No	No
Database Example	123.45.78.401	123.45.78.401	No	No

### NIST Accepted Values

```
prop
 • name="virtual"
 ○ Valid: yes, no
 • name="public"
 ○ Valid: yes, no
annotation
 • name="allows-authenticated-scan"
 ○ Valid: yes, no
 • name="is-scanned"
 ○ Valid: yes, no
```

OS/Infrastructure Inventory								
NetBIOS Name	MAC Address	Authenticated Scan	Baseline Configuration Name	OS Name and Version	Location	Asset Type	Hardware Make/Model	In Latest Scan
linux01	00:00:00:00:00	Yes	Base Config1	Cent				

### FedRAMP Accepted Values

```
prop
 • name="asset-type"
 ○ Valid: os, database, web-server, dns-server, email-server, directory-server, pbx, firewall, router, switch, storage-array
```

Other values are allowed for now.

Software and Database Inventories				Any Inventory				
Software/Database Vendor	Software/Database Name & Version	Patch Level	Function	Comments	Serial #/Asset Tag#	VLAN/Network ID	System Administrator/Owner	Application Administrator/Owner
Acme Software	Acme CloudApp v1.0	CFM4						

The description and remarks fields are *Markup multiline*, which enables the text to be formatted.

This requires special handling. See [Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL](#), or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

## 6.5.2. Component-based Approach

### Component-based Representation

```
<!-- cut -->
<system-implementation>
 <component uuid="uuid-value" component-type=" software " >
 <prop name="virtual">no</prop>
 <prop name="software-name">software-name</prop>
 <prop name="version">V 0.0.0</prop>
 <prop name="asset-type">os</prop>
 <prop name="vendor-name" ns="https://fedramp.gov/ns/oscal">Vendor Name</prop>
 <prop name="model">Model Number</prop>
 <prop name="patch-level">Patch-Level</prop>
 <prop name="scan-type" ns="https://fedramp.gov/ns/oscal">infrastructure</prop>
 <prop name="validation" ns="https://fedramp.gov/ns/oscal">component-id</prop>
 <annotation name="allows-authenticated-scan" value="no">
 <remarks><p>If no, explain why. If yes, omit remarks field.</p></remarks>
 </annotation>
 <annotation name="baseline-configuration-name" value="Baseline Config. Name" />
 <annotation name="function" value="Required brief, text-based description." >
 <remarks><p>Optional, longer, formatted description.</p></remarks>
 </annotation>
 <responsible-party role-id="asset-owner">
 <party-id>person-7</party-id>
 </responsible-party>
 <responsible-party role-id="asset-administrator">
 <party-id>it-dept</party-id>
 </responsible-party>
 </component>
 <!-- service, interconnection -->
<system-inventory>
```

```
 <inventory-item uuid="uuid-value" asset-id="unique-asset-id">
 <description><p>If needed, describe this instance.</p></description>
 <prop name="ipv4-address">0.0.0.0</prop>
 <prop name="public">no</prop>
 <prop name="fqdn">dns.name</prop>
 <prop name="uri">uniform.resource.identifier</prop>
 <prop name="mac-address">00:00:00:00:00:00</prop>
 <prop name="serial-number">Serial #</prop>
 <prop name="vlan-id">VLAN Identifier</prop>
 <prop name="network-id">Network Identifier</prop>
 <annotation name="is-scanned" value="yes" />
 <implemented-component component-id="component-sample" />
 <remarks><p>COMMENTS: Additional information about this item.</p></remarks>
 </inventory-item>
 <!-- Repeat the inventory-item assembly for each use of the above component -->
</system-inventory>
 <!-- system-implementation remarks -->
</system-implementation>
```

### NIST-Defined Identifier

Required Role ID:

- asset-owner
- asset-administrator

### XPath Queries

[See Section 6.5.3, Inventory Data Locations and XPath Queries](#)

### NOTES:

- If component-sample is an image of a Linux virtual machine (VM), and 10 instances of that VM are in use, there would be one (1) component assembly and ten (10) inventory-item assemblies, all referencing the same component.

### 6.5.3. Inventory Data Locations and XPath Queries

The

		<b>Guidance</b>	<b>Valid Values</b>	<b>Requirement</b>	<b>Component</b>	<b>Inventory-Item</b>	<b>OSCAL Cardinality</b>	<b>Data Location: XPath Notation (CASE SENSITIVE)</b>	<b>NOTES</b>
<b>All Inventories</b>	<b>UNIQUE ASSET IDENTIFIER</b>	Unique Identifier associated with the asset. This Identifier should be used consistently across all documents, 3PAOs artifacts, and any vulnerability scanning tools. For OS/Infrastructure and Web Application Software, this is typically an IP address or URL/DNS name. For a database, it is typically an IP address, URL, or database name. A CSP's own naming scheme is also acceptable as long as it has unique identifiers.	Must be unique.	Mandatory for all inventory records.		X	1	<code>/*/system-implementation/system-inventory/inventory-item[@asset-id="___"]</code>	The system-specific "Unique Asset Identifier" must be set as the asset-id flag on the inventory-item field.
	<b>IPv4 or IPv6 Address</b>	If available, state the IPv4 or IPv6 address of the inventory item. This can be left blank if one does not exist, or if it is a dynamic field. If the IP address is used as the Unique Asset Identifier, then this field will duplicate the contents of the Unique Asset Identifier column.  If a device has multiple IP addresses, then include one row in this inventory for each IP address.		Optional, unless used as Identifier in vulnerability scans or security assessments.		X	0 - ∞	<code>/*/system-implementation/system-inventory/inventory-item/prop[@name="ipv4-address"]</code>  <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="ipv6-address"]</code>	One prop field per IP address, if more than one.
	<b>Virtual</b>	Is this asset virtual?	Yes or No.	Mandatory for OS/Infrastructure, Software, and Database.	X	X	1	<code>/*/system-implementation/component/prop[@name="virtual"]</code>  <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="virtual"]</code>	Must have "Virtual" at the inventory item-level either explicitly, or via a linked component.  May define it at component level and propagate to inventory-item.
	<b>Public</b>	Is this asset a public facing device? That is, is it outside the boundary? If so, it is an entry point.	Yes or No.	Mandatory for OS/Infrastructure, Software, and Database.		X	1	<code>/*/system-implementation/system-inventory/inventory-item/prop[@name="public"]</code>	
	<b>DNS Name or URL</b>	If available, state the DNS name or URL of the inventory item. This can be left blank if one does not exist, or it is a dynamic field.	Valid DNS name or URL.	Optional, unless used as Identifier in vulnerability scans or security assessments.		X	0 - ∞	<code>/*/system-implementation/system-inventory/inventory-item/prop[@name="fqdn"]</code>  <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="uri"]</code>	May use either DNS name, URL or both. Use a separate prop field for each DNS name and/or URL.

	Guidance	Valid Values	Requirement	Component	Inventory-Item	OSCAL Cardinality	Data Location: XPath Notation (CASE SENSITIVE)	NOTES
OS/Infrastructure Inventory	<b>NetBIOS Name</b>	If available, state the NetBIOS name. May be left blank if one does not exist, or dynamic.	Valid NetBIOS name.	Optional, unless used as identifier in scans or security assessments.	X	0 - ∞	<code>/*/system-implementation/system-inventory/inventory-item/prop[@name="netbios-name"]</code>	One prop field per NetBIOS name, if more than one.
	<b>MAC Address</b>	If available, state the MAC Address. May be left blank if one does not exist, or dynamic.	Valid MAC Address.	Optional, unless used as identifier in scans or security assessments.	X	0 - ∞	<code>/*/system-implementation/system-inventory/inventory-item/prop[@name="mac-address"]</code>	One prop field per MAC address, if more than one.
	<b>Authenticated Scan</b>	Is the asset is planned for an authenticated scan?	Yes or No.	Mandatory for OS/Infrastructure. Leave blank for Software and Database.	X	X	1  <code>/*/system-implementation/component/annotation[@name="allows-authenticated-scan"]/@value=""</code>  <code>/*/system-implementation/system-inventory/inventory-item/annotation[@name="allows-authenticated-scan"]/@value=""</code>	Must have "Authenticated-Scan" at the inventory-item level either explicitly or via a linked component.  May define it at component level and propagate to inventory-item.
	<b>Baseline Configuration Name</b>	If available, provide the name of the configuration template used within the CSP configuration management.	.	Mandatory for OS/Infrastructure. Leave blank for Software and Database.	X	X	1  <code>/*/system-implementation/component/annotation[@name="baseline-configuration-name"]/@value=""</code>  <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="baseline-configuration-name"]/@value=""</code>	Must have "Baseline Configuration Name" at the inventory-item level either explicitly or via a linked component.  May define it at component level and propagate to inventory-item.
	<b>OS Name and Version</b>	Operating System Name and Version running on the asset.		Optional for OS/Infrastructure. Leave blank for Software and Database.	X	0 or 1	<code>/*/system-implementation/component/prop[@name="software-name"][@ns="https://fedramp.gov/ns/oscal"]</code>  <code>/*/system-implementation/component/prop[@name="version"]</code>  <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="software-name"]</code>  <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="software-version"]</code>	Use software name and version, and set asset-type of "os". Required for operating systems.  Must have "OS Name and Version" at the inventory-item level either explicitly or via a linked component. May define it at the component level and propagate to inventory item.
	<b>Location</b>	Physical location of hardware. Could include Data Center ID, Cage#, Rack# or other meaningful location identifiers.	Valid locations for CSP infrastructure.	Optional for OS/Infrastructure. Leave blank for Software and Database.	X	0 or 1	<code>/*/system-implementation/system-inventory/inventory-item/prop[@name="physical-location"]/@value=""</code>	
	<b>Asset Type</b>	Simple description of the asset's function (e.g., Router, Storage Array, DNS Server, etc.)		Mandatory for OS/Infrastructure. Leave blank for Software and Database.	X	X	1  <code>/*/system-implementation/component/prop[@name="asset-type"]</code>  <code>/*/system-implementation/system-inventory/inventory-item[@name="asset-type"]</code>	Must use an Accepted Value (see Registry) if an applicable one exists.  Must have "Asset Type" at the inventory-item level, either explicitly or via a linked component. May define it at component level and propagate to inventory-item.
	<b>Hardware Make/Model</b>	Name of the hardware product and model.		Mandatory for OS/Infrastructure. Leave blank for Software and Database.	X	X	0 or 1  <code>/*/system-implementation/component/prop[@name="vendor-name"][@ns="https://fedramp.gov/ns/oscal"]</code>  <code>/*/system-implementation/component/prop[@name="model"]</code>  <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="vendor-name"][@ns="https://fedramp.gov/ns/oscal"]</code>  <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="hardware-model"]</code>	Must have "Hardware Vendor" and "Hardware Model" at the inventory item-level either explicitly, or via a linked component. May define it at component level and propagate to inventory-item.  <b>NOTE:</b> @name="model" at component level, but @name="hardware-model" at inventory level.
	<b>In Latest Scan</b>	Should the asset appear in the network scans and can it be probed by the scans creating the current POA&M?	Yes or No.	Mandatory for OS/Infrastructure. Leave blank for Software and Database.	X	1	<code>/*/system-implementation/system-inventory/inventory-item/annotation[@name="is-scanned"]/@value=""</code>	

	<b>Guidance</b>	<b>Valid Values</b>	<b>Requirement</b>	<b>Component</b>	<b>Inventory-Item</b>	<b>OSCAL Cardinality</b>	<b>Data Location: XPath Notation (CASE SENSITIVE)</b>	<b>NOTES</b>
<b>Software and Database Inventories</b>	<b>Software/Database Vendor</b>	Name of Software or Database vendor.	If open source (e.g., there is no "vendor"), enter "Open Source" as the vendor name.	Mandatory for Software and Database. Leave blank for OS/Infrastructure.	X	X	<b>0 or 1</b>	<pre>/*/system-implementation/component/prop[@name="vendor-name"][@ns="https://fedramp.gov/ns/oscal"]</pre> <pre>/*/system-implementation/system-inventory/inventory-item/prop[@name="vendor-name"][@ns="https://fedramp.gov/ns/oscal"]</pre>
	<b>Software/Database Name &amp; Version</b>	Name of Software or Database product and version number.		Mandatory for Software or Database. Leave blank for OS/Infrastructure.	X	X	<b>0 or 1</b>	<pre>/*/system-implementation/component/prop[@name="software-name"][@ns="https://fedramp.gov/ns/oscal"]</pre> <pre>/*/system-implementation/component/prop[@name="version"]</pre> <pre>/*/system-implementation/system-inventory/inventory-item/prop[@name="software-name"]</pre> <pre>/*/system-implementation/system-inventory/inventory-item/prop[@name="software-version"]</pre>
	<b>Patch Level</b>	If applicable.	<u>Optional</u> if applicable. Otherwise, leave blank.	X	X	<b>0 or 1</b>	<pre>/*/system-implementation/component/prop[@name="patch-level"]</pre> <pre>/*/system-implementation/system-inventory/inventory-item/prop[@name="software-patch-level"]</pre>	The "Patch Level" may be specified at the component or inventory-item level.
	<b>Function</b>	For Software or Database, the function provided by the Software or Database for the system.		Mandatory for Software or Database. Leave blank for OS/Infrastructure.	X	X	<b>0 or 1</b>	<pre>/*/system-implementation/component/annotation[@name="function"]/@value=""</pre> <pre>/*/system-implementation/component/annotation[@name="function"]/remarks</pre> <pre>/*/system-implementation/system-inventory/inventory-item/annotation[@name="function"]/@value=""</pre> <pre>/*/system-implementation/system-inventory/inventory-item/annotation[@name="function"]/remarks</pre>

	Guidance	Valid Values	Requirement	Component	Inventory -Item	OSCAL Cardinality	Data Location: XPath Notation (CASE SENSITIVE)	NOTES
Any Inventory	Comments	Any additional information that could be useful to the reviewer.		Optional for OS/Infrastructure, Software and Database.	X	X	<b>0 or 1</b> <code>/*/system-implementation/component/remarks</code> <code>/*/system-implementation/system-inventory/inventory-item/remarks</code>	May have comments in either the component level, inventory-item level or both.
	Serial #/Asset Tag#	Product serial number or internal asset tag #.		Optional for OS/Infrastructure, Software, and Database.		X	<b>0 or 1</b> <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="serial-number"]</code> <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="asset-tag"]</code>	
	VLAN/Network ID	Virtual LAN or Network ID.		Optional for OS/Infrastructure, Software, and Database.		X	<b>0 or 1</b> <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="vlan-id"]</code> <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="network-id"]</code>	
	System Administrator or Owner	Name of the system administrator or owner.		Mandatory for HIGH impact systems. Optional for Low and Moderate impact systems.	X	X	<b>1</b> <code>COMPONENT OWNER (Person):</code> <code>/*/metadata/party[@id=/*/system-implementation/component/responsible-role[@role-id="asset-owner"]/party-id]/person/person-name</code> <code>COMPONENT ADMINISTRATOR (Org):</code> <code>/*/metadata/party[@id=/*/system-implementation/component/responsible-role[@role-id="asset-administrator"]/party-id]/org/org-name</code> <code>INVENTORY ITEM OWNER (Person):</code> <code>/*/metadata/party[@id=/*/system-implementation/system-inventory/inventory-item/responsible-party[@role-id="asset-owner"]/party-id]/person/person-name</code> <code>INVENTORY ITEM ADMINISTRATOR (Org):</code> <code>/*/metadata/party[@id=/*/system-implementation/system-inventory/inventory-item/responsible-party[@role-id="asset-administrator"]/party-id]/org/org-name</code>	Must have "System Owner/Administrator" at the inventory item-level. May define it at component level and propagate to inventory-item. May have a separate "system owner/administrator" at the component level.
	Application Administrator or Owner	Name of the application administrator or owner.		Optional for OS/Infrastructure, Software, and Database.	X	X	<b>1</b> <code>COMPONENT OWNER (Person):</code> <code>/*/metadata/party[@id=/*/system-implementation/component/responsible-role[@role-id="asset-owner"]/party-id]/person/person-name</code> <code>COMPONENT ADMINISTRATOR (Org):</code> <code>/*/metadata/party[@id=/*/system-implementation/component/responsible-role[@role-id="asset-administrator"]/party-id]/org/org-name</code> <code>INVENTORY ITEM OWNER (Person):</code> <code>/*/metadata/party[@id=/*/system-implementation/system-inventory/inventory-item/responsible-party[@role-id="asset-owner"]/party-id]/person/person-name</code> <code>INVENTORY ITEM ADMINISTRATOR (Org):</code> <code>/*/metadata/party[@id=/*/system-implementation/system-inventory/inventory-item/responsible-party[@role-id="asset-administrator"]/party-id]/org/org-name</code>	Must have "Application Owner/Administrator" at the inventory item-level. May define it at component level and propagate to inventory-item. May have a separate "system owner/administrator" at the component level.
	Scan Type	Indicate which scan type(s) the item is subjected to.	infrastructure, database, web-server	Mandatory	X	X	<b>1</b> <code>/*/system-implementation/component/prop[@name="scan-type"][@ns="https://fedramp.gov/ns/oscal"]</code> <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="scan-type"][@ns="https://fedramp.gov/ns/oscal"]</code>	Valid values: infrastructure, web, database. If more than one type is applicable, use one field per type.
ADDITIONAL	FIPS 140-2 Validation	Indicate the certificate information for an inventory item with a FIPS 140-2 validated cryptographic module.	component-id	Mandatory for any item involving cryptography. Omit otherwise.	X	X	<b>0 - ∞</b> <code>/*/system-implementation/component/prop[@name="validation"][@ns="https://fedramp.gov/ns/oscal"]</code> <code>/*/system-implementation/system-inventory/inventory-item/prop[@name="validation"][@ns="https://fedramp.gov/ns/oscal"]</code>	If an item has more than one cryptographic module, use one entry per validation certificate. May define "FIPS 140-2 validation" at the component level and propagate to the inventory-item level.

## ATTACHMENT I3 FEDRAMP INVENTORY WORKBOOK

All Authorization Packages must the Inventory attachment, which will be reviewed for quality.

When completed, FedRAMP will accept this inventory workbook as the inventory information required by the following:

- System Security Plan
- Security Assessment Plan
- Security Assessment Report
- Information System Contingency Plan
- Initial POAM
- Monthly Continuous Monitoring (POAM or as a separate document)

The FedRAMP Inventory Workbook can be found on the following FedRAMP website page: [Templates](#).

Note: A complete and detailed list of the system hardware and software inventory is required per NIST SP 800-53, Rev 4 CM-8.

	All Inventories				
	UNIQUE ASSET IDENTIFIER	IPv4 or IPv6 Address	Virtual	Public	DNS Name or URL
OS/Infrastructure Example	123.45.78.90	123.45.78.90	No	Yes	linux01.iaas.org
Software Example	123.45.78.400	123.45.78.400	No	No	
Database Example	123.45.78.401	123.45.78.401	No	No	

OS/Infrastructure Inventory									
NetBIOS Name	MAC Address	Authenticated Scan	Baseline Configuration Name	OS Name and Version	Location	Asset Type	Hardware Make/Model	In Latest Scan	
linux01	00:00:00:00:00	Yes	Base Config1	CentOS 5.1	n/a	Web Server	Acme Server	No	

Software and Database Inventories				Any Inventory					
Software/Database Vendor	Software/Database Name & Version	Patch Level	Function	Comments	Serial #/Asset Tag#	VLAN/Network ID	System Administrator/Owner	Application Administrator/Owner	
Acme Software	Acme CloudApp v1.0		CRM						
Oracle	Oracle v11		Records Management						

### XPath Queries

Number of Inventory Items:  
`count(/system-implementation/system-inventory/inventory-item)`

Number of Hardware Components:  
`count(/system-implementation/component[@component-type="hardware"])`

Number of Software Components:  
`count(/system-implementation/component[@component-type="software"])`

In Latest Scan?:  
`/*/system-implementation/system-inventory/inventory-item[1]/annotation[@name="is-scanned"]/@value`

Replace "[1]" with "[2]", "[3]", etc.

List Inventory Items Not Scanned:  
`/*/system-implementation/system-inventory/inventory-item/annotation[@name="is-scanned"][@value='no']/..//prop[@name='ipv4-address']`

List of Reasons Inventory Items Were Not Scanned:  
`/*/system-implementation/system-inventory/inventory-item/annotation[@name="is-scanned"][@value='no']/remarks`

The `remarks` field is *Markup multiline*, which enables the text to be formatted. This requires special handling. See [Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL](#), or visit: <https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

## ATTACHMENT 13 FEDRAMP INVENTORY WORKBOOK

All Authorization Packages must the Inventory attachment, which will be reviewed for quality.

When completed, FedRAMP will accept this inventory workbook as the inventory information required by the following:

- System Security Plan
- Security Assessment Plan
- Security Assessment Report
- Information System Contingency Plan
- Initial POAM
- Monthly Continuous Monitoring (POAM or as a separate document)

The FedRAMP Inventory Workbook can be found on the following FedRAMP website page: [Templates](#).

Note: A complete and detailed list of the system hardware and software inventory is required per NIST SP 800-53, Rev 4 CM-8.

All Inventories			
IPv4 or IPv6 Address	Virtual	Public	DNS Name or URL
If available, state the IPv4 or IPv6 address of the inventory item. This can be left blank if one does not exist, or if it is a dynamic field. If the IP address is used as the Unique Asset Identifier, then this field will duplicate the contents of the Unique Asset Identifier column.  If a device has multiple IP addresses, then include one row in this inventory for each IP address.	Is this asset virtual?  Is this asset a public facing device? That is, is it outside the boundary? If so, it is an entry point.		If available, state the DNS name or URL of the inventory item. This can be left blank if one does not exist, or it is a dynamic field.
	Yes or No.	Yes or No.	Valid DNS name or URL.
<small>Optional, unless used as identifier in vulnerability scans or security assessments.</small>	<small>Mandatory for OS/Infrastructure, Software, and Database.</small>	<small>Mandatory for OS/Infrastructure, Software, and Database.</small>	<small>Optional, unless used as identifier in vulnerability scans or security assessments.</small>

Any Inventory				
Comments	Serial#/Asset Tag#	VLAN/Network ID	System Administrator/Owner	Application Administrator/Owner
Any additional information that could be useful to the reviewer.	Product serial number or internal asset tag #.	Virtual LAN or Network ID.	Name of the system administrator or owner.	Name of the application administrator or owner.
<small>Optional for OS/Infrastructure, Software and Database.</small>	<small>Optional for OS/Infrastructure, Software, and Database.</small>	<small>Optional for OS/Infrastructure, Software, and Database.</small>	<small>Mandatory for HIGH impact systems. Optional for Low and Moderate impact systems.</small>	<small>Optional for OS/Infrastructure, Software, and Database.</small>

Unlike most XPath 2.0 queries in this document, the following queries cannot be easily converted to XPath 1.0 . If working with XPath 1.0, it may be necessary to perform each search with two queries. These queries will list all the IPv4 addresses for each scan type (infrastructure, web, and database), whether using the flat-file inventory approach or the component-based approach.

### XPath 2.0 Queries

IPv4 Address of All Inventory Items Identified for **Infrastructure Scanning**:  
`distinct-values( (let $key:=/*/system-implementation/component[prop[@name='scan-type']]  
[@ns='https://fedramp.gov/ns/oscal']='infrastructure')/@id return /*/system-implementation/  
system-inventory/inventory-item [implemented-component/@component-id=$key]/  
prop[@name='ipv4-address']) | /*/system-implementation/system-inventory/inventory-item/  
prop[@name='ipv4-address'][..]/prop[@name='scan-type'][@ns='https://fedramp.gov/ns/oscal']  
[string(.)='infrastructure']) )`

IPv4 Address of All Inventory Items Identified for **Web Scanning**:  
`distinct-values( (let $key:=/*/system-implementation/component[prop[@name='scan-type']]  
[@ns='https://fedramp.gov/ns/oscal']='web')/@id return /*/system-implementation/system-  
inventory/inventory-item [implemented-component/@component-id=$key]/prop[@name='ipv4-  
address']) | /*/system-implementation/system-inventory/inventory-item/prop[@name='ipv4-  
address'][..]/prop[@name='scan-type'][@ns='https://fedramp.gov/ns/oscal'][string(.)='web']) )`

IPv4 Address of All Inventory Items Identified for **Database Scanning**:  
`distinct-values( (let $key:=/*/system-implementation/component[prop[@name='scan-type']]  
[@ns='https://fedramp.gov/ns/oscal']='database')/@id return /*/system-implementation/  
system-inventory/inventory-item [implemented-component/@component-id=$key]/  
prop[@name='ipv4-address']) | /*/system-implementation/system-inventory/inventory-item/  
prop[@name='ipv4-address'][..]/prop[@name='scan-type'][@ns='https://fedramp.gov/ns/oscal']  
[string(.)='database']) )`

#### Items Where an Authenticated Scan is Possible:

`distinct-values( /*/system-implementation/system-inventory/inventory-item/prop  
[@name='ipv4-address'][..]/annotation[@name='allows-authenticated-scan'][@value='yes']] ) |  
(let $key:=/*/system-implementation/component[annotation[@name='allows-authenticated-  
scan'][@value='yes']]@id return /*/system-implementation/system-inventory/inventory-item  
[implemented-component/@component-id=$key]/prop[@name='ipv4-address']) )`

#### Items Where an Authenticated Scan is Not Possible:

`distinct-values( /*/system-implementation/system-inventory/inventory-item/  
prop[@name='ipv4-address'][..]/annotation[@name='allows-authenticated-scan'][@value='no']] ) |  
( let $key:=/*/system-implementation/component[annotation[@name='allows-authenticated-  
scan'][@value='no']]@id return /*/system-implementation/system-inventory/inventory-item  
[implemented-component/@component-id=$key]/prop[@name='ipv4-address']) )`

#### Authenticated Scan Justification (if Authenticate Scan is "no"):

`/*/system-implementation/system-inventory/inventory-item/annotation[@name=  
"allows-authenticated-scan"][@value="no"])/remarks`

OR

`/*/system-implementation/component/annotation[@name="allows-authenticated-scan"]  
[@value="no"])/remarks`

The `remarks` field is *Markup multiline*, which enables the text to be formatted. This requires special handling. See [Section 2.5.3 Markup-line and Markup-multiline Fields in OSCAL](#), or visit:  
<https://pages.nist.gov/OSCAL/documentation/schema/datatypes/#markup-multiline>

## 7. GENERATED CONTENT

The following artifacts are historically generated by hand to summarize content found in other portions of the FedRAMP SSP. When using OSCAL, these artifacts can be generated from content found elsewhere in this document. This includes the:

- **Control Information Summary (CIS)**
- **Customer Responsibility Matrix (CRM)**

If delivering SSP content in OSCAL, CSPs are no longer required to manually generate and maintain these artifacts, provided the content in their OSCAL-based FedRAMP SSP remains accurate.

**Tool developers are encouraged to develop their own solutions to generating this content.**

### 7.1. Generating the Control Information Summary (CIS)

There are many ways a tool developer can generate the CIS. FedRAMP is developing an Extensible Stylesheet Language Transformation (XSLT) file to generate the FedRAMP CIS. When ready, FedRAMP will make this freely available to the public here:

<https://github.com/GSA/fedramp-automation/tree/master/resources>

### 7.2. Generating the Customer Responsibility Matrix (CRM)

There are many ways a tool developer can generate the CRM. FedRAMP is developing an Extensible Stylesheet Language Transformation (XSLT) file to generate the FedRAMP CRM. When ready, FedRAMP will make this freely available to the public here:

<https://github.com/GSA/fedramp-automation/tree/master/resources>

Useful CRM XPath Queries
<pre>Flat-File CRM Query: //control-implementation/implemented-requirement/annotation[@name= "control-origination"][@ns="https://fedramp.gov/ns/oscal"] [@value="customer-configured" or @value="customer-provided"]/remarks  Component-based CRM Query: //control-implementation/implemented-requirement/statement/by-component [@component-id="customer"]/description</pre>

## APPENDICES

## APPENDIX A. WORKING WITH COMPONENTS

NIST designed OSCAL such that a system architect can express all aspects of the system as components. A component is anything that can satisfy a control requirement. This includes hardware, software, services, and underlying service providers, as well as policies, plans, and procedures. There are several ways to use components in an OSCAL-based SSP. The following defines FedRAMP's minimum initial use.

*Anything that can satisfy a control requirement is a component, including hardware, software, services, policies, plans, and procedures.*

This section will likely be updated as NIST continues to evolve its approach to components in OSCAL, and as FedRAMP receives feedback from stakeholders.

**FedRAMP-defined component identifiers are cited in relevant portions of this document, and summarized in the FedRAMP OSCAL Registry.**

### Minimum Required Components

There must be a component that represents the entire system itself, and has the ID "system".

If there is one or more controls with a `customer-provided` or `customer-configured` control origination, there should also be a component that represents customers and has the ID "customer".

The implementation statements are tied to this component as described in *Section 5.6, Control Implementation Description: Approaches*, and are summarized into the Customer Responsibility Matrix (CRM).

The following is an example of defined components.

#### Minimum Required Component Representation

```
<!-- system-characteristics -->
<system-implementation>
 <!-- user -->

 <!-- This System -->
 <component uuid="uuid-value" component-type="system" >
 <title>This System</title>
 <description><p>
 The entire system as depicted in the system authorization boundary.
 </p></description>
 <status state="operational" />
 </component>

 <!-- Customer -->
 <component uuid="uuid-value" component-type="customer" >
 <title>Customer</title>
 <description><p>Customer's Responsibility</p></description>
 <status state="other" />
 </component>
</system-implementation>
```

*NIST is changing the approach to the CRM for the OSCAL 1.0.0.0 release. This section will be updated when that approach is more completely defined.*

## Common Additional Components

If there is an underlying FedRAMP-authorized system, from which the subject system is inheriting controls, there must be a component for that as well, with the ID "comp-fedramp-authorized-provider-1".

For each FIPS 140-2 validated module, there must be a component that represents the validation certificate itself. For more information about this, see the *FIPS 140-2 Validated Components* Section.

### Common Additional Component Representation

```
<!-- system-characteristics -->
<system-implementation>
 <!-- user -->
 <!-- Minimum Required Components -->

 <!-- Leveraged FedRAMP-authorization system -->
 <component uuid="uuid-value" component-type="service" >
 <title>[Provider System's Name]</title>
 <description><p>A FedRAMP-authorized system.</p></description>
 <prop name="authorization-date" ns="https://fedramp.gov/ns/oscal">2019-01-01</prop>
 <status state="operational" />
 </component>

 <!-- FIPS 140-2 Validation Certificate Information -->
 <!-- Include a separate component for each relevant certificate -->
 <component uuid="uuid-value" component-type="validation">
 <title>Module Name</title>
 <description><p>FIPS 140-2 Validated Module</p></description>
 <prop name="cert-no" ns="https://fedramp.gov/ns/oscal">0000</prop>
 <link href="https://csrc.nist.gov/projects/cryptographic-module-validation-program/Certificate/0000" />
 <status state="operational" />
 </component>

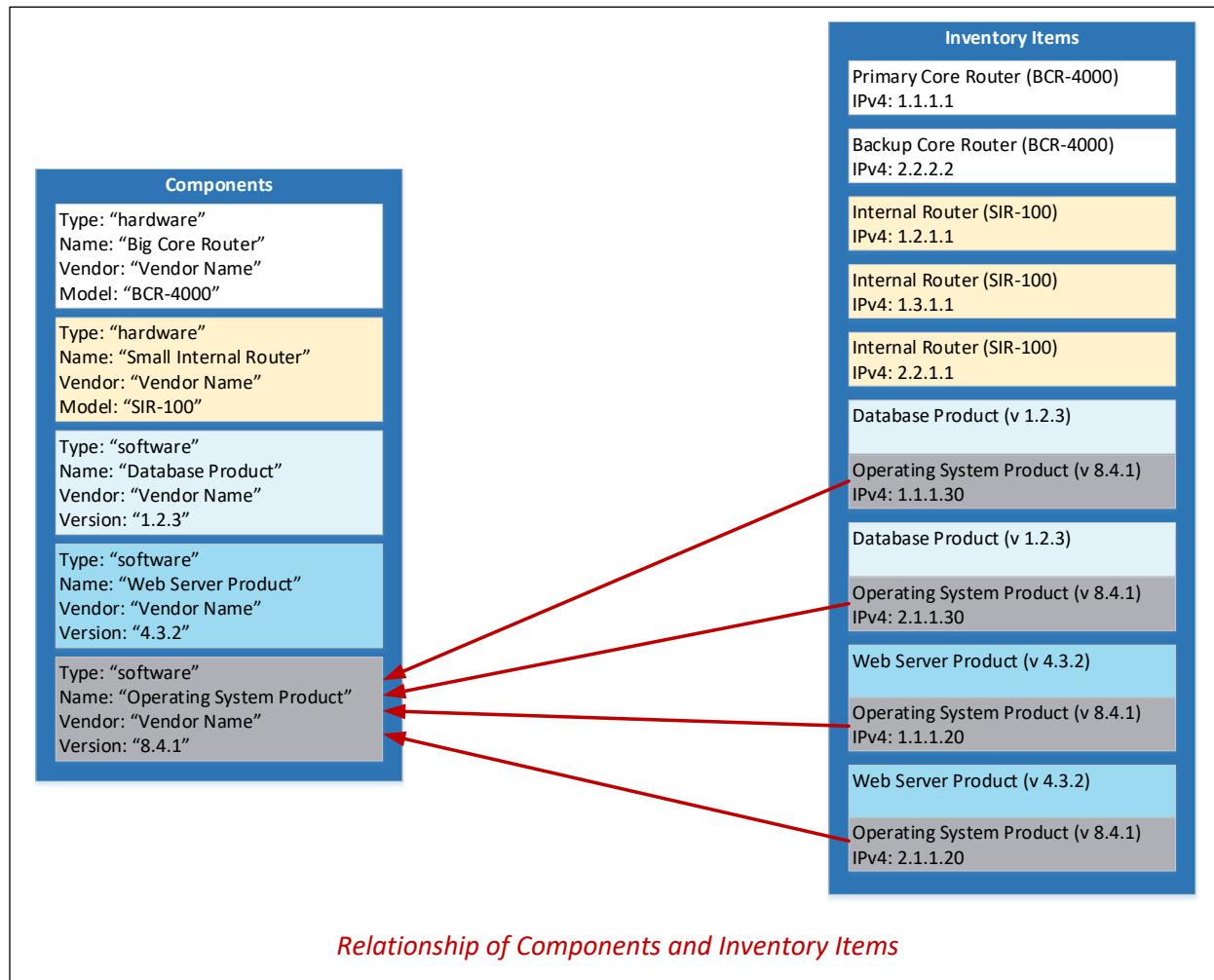
 <!-- service -->
</system-implementation>
<!-- control-implementation -->
```

## Components as a Basis for System Inventory

NIST's approach to component-based system modeling is to reduce redundancy of information and increase flexibility. NIST accomplishes this with separate component and inventory item modeling.

This is a one-to-many relationship. One component to many inventory item instances.

For example, if an open source operating system (OS) is used in many places throughout the system, it is defined once as a component. All information about the product, vendor, and support are modeled within the component detail. If the OS is used four times within the system, each use is an inventory item, with details about that specific information, such as IP address,



FedRAMP requires a component assembly for each model of infrastructure device used, and each version of software and database used within the system. FedRAMP is not asking for more detail than provided in the legacy inventory workbook. Only that the information is organized differently.

As NIST continues to evolve its component approach, FedRAMP will re-evaluate its approach to system inventory representation.

## FIPS 140-2 Validated Components

NIST's component model treats independent validation of products and services as if that validation were a separate component. This means when using components with FIPS 140-2 validated cryptographic modules:

- **The Validation Definition:** A component definition that provides details about the validation.
- **The Product Definition:** A component definition that describes the hardware or software product.

The validation definition is a component definition that provides details about the independent validation. In the case of FIPS 140-2 validation, this must provide the certificate number, and the link to entry in the NIST Computer Security Resource Center (CSRC) [Cryptographic Module Validation Program Database](#).

In the future, NIST will provide syntax that allows the product and the validation to be linked; however, this syntax is not yet available, so FedRAMP is providing alternative syntax to accomplish the linking.

While FedRAMP requires the separate component definition for FIPS 140-2 validation, linking those components using the FedRAMP extension is optional. Once NIST provides final syntax to link a product and its validation, that link will become mandatory.

Component Representation: Example Product With FIPS 140-2 Validation
<pre>&lt;!-- system-characteristics --&gt; &lt;system-implementation&gt;     &lt;!-- user --&gt;     &lt;!-- Minimum Required Components --&gt;      &lt;!-- FIPS 140-2 Validation Certificate Information --&gt;     &lt;!-- Include a separate component for each relevant certificate --&gt;     &lt;component uuid="<b>uuid-value</b>" component-type="validation"&gt;         &lt;title&gt;Module Name&lt;/title&gt;         &lt;description&gt;&lt;p&gt;FIPS 140-2 Validated Module&lt;/p&gt;&lt;/description&gt;         &lt;prop name="cert-no" ns="https://fedramp.gov/ns/oscal"&gt;0000&lt;/prop&gt;         &lt;link href="https://csrc.nist.gov/projects/cryptographic-module-validation-program/Certificate/0000" /&gt;         &lt;status state="operational" /&gt;     &lt;/component&gt;      &lt;!-- FIPS 140-2 Validated Product --&gt;     &lt;component uuid="<b>uuid-value</b>" component-type="software" &gt;         &lt;title&gt;Product Name&lt;/title&gt;         &lt;description&gt;&lt;p&gt;A product with a cryptographic module.&lt;/p&gt;&lt;/description&gt;         &lt;status state="operational" /&gt;     &lt;/component&gt;      &lt;!-- service --&gt; &lt;/system-implementation&gt; &lt;!-- control-implementation --&gt;</pre>